

SEP 12 1929

Registered at the G.P.O., Sydney, for Transmission by Post as a Newspaper.

Published Weekly.

Price 1s.

THE MEDICAL JOURNAL OF AUSTRALIA



VOL. II.—16TH YEAR.

SYDNEY, SATURDAY, AUGUST 10, 1929.

No. 6.

'Allenburys' PASTILLES

The Criterion of Excellence.

GLYCERINE AND BLACK CURRANT

The full value and flavour of the choice ripe black currants used, are conserved in these Pastilles. They have a demulcent and mildly astringent effect most useful in allaying simple irritations of the throat, such as are caused by too much smoking, overstrain of the voice or catarrhal conditions.

A sample package will gladly be sent to any Physician on request.

MEDICATED

These are virtually solidified solutions or emulsions presenting the medicaments they contain in the finest possible state of division, in a bland medium.

The most general used varieties of these Pastilles are available from stock in Australia.

Further particulars and list will be sent to members of the Medical Profession on request.

ALLEN & HANBURY'S (AUSTRALASIA) LTD.

13, MARKET STREET, SYDNEY, N.S.W.



Tested Tyre vitality

THE testing machines above show what happens on the inside of a Goodyear Tyre when it is being bumped over the road—it shows why Goodyear Tyres, made with Supertwist, are stronger, longer-lived, and more elastic. It will prove that Supertwist cord stretches 60% farther than any other cord.

This extra stretch gives Goodyear Tyres, made in Australia, added strength to withstand road shocks and continuous flexing without premature failure.

More people, the world over, ride on Goodyear tyres than on any other kind.

GOODYEAR

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—16TH YEAR.

SYDNEY, SATURDAY, AUGUST 10, 1929.

No. 6.

Authors of articles submitted for publication are requested to read the following instructions and to comply with them.

All articles must be typed with double or treble spacing. Carbon copies should not be sent. Abbreviations should be avoided, especially those of a technical character at times employed in ward notes. Words and sentences should not be underlined or typed in capitals. The selection of the correct type is undertaken by the Editors. When illustrations are required, good photographic prints on glossy gaslight papers should be submitted. Each print should be enclosed in a sheet of paper. On this sheet of paper the number of the figure and

the legend to appear below the print should be typed or legibly written. On no account should any mark be made on the back of the photographic print. If no good print is available, negatives may be submitted. Line drawings, graphs, charts and the like should be drawn on thick, white paper in India ink by a person accustomed to draw for reproduction. The drawings should be large and boldly executed and all figures, lettering and symbols should be of sufficient strength and size to remain clear after reduction. Skiagrams can be reproduced satisfactorily only if good prints or negatives are available. The reproduction of all illustrations but especially of skiagrams entails the sacrifice of

time and energy and is expensive. Authors are expected to take a corresponding amount of trouble on the preparation of their illustrations, whether skiagrams, photographs, wash drawings or line drawings. The references to articles and books quoted must be accurate and should be compiled according to the following scheme. The order should correspond to the order of appearance in the article. The initials and surnames of the authors, the full title of the article or book, the full (unabbreviated) title of the journal in which the article appears, the date of the issue (day, month and year) and the number of the first page should be given in this sequence.

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—

	PAGE.
"Some Modern Aspects of the Cancer Problem," by L. M. McKillop, M.B., F.R.C.S., F.C.S.A.	180
"Two Old Midwifery Books," by CONSTANCE E. D'ARCY, M.B., Ch.M.	186
"An Easily Constructed Intratracheal Anaesthetic Apparatus," by A. B. KEITH WATKINS, M.S., F.R.C.S.	191
"A Normogram Showing the Relation of Gastric Activity and Acidity to the Blood and to Certain Physical Characteristics: An Aid to Diagnosis and Treatment," by FRANK L. APPERLY, M.A., M.D., D.Sc., and KATHLEEN M. SEMMENS, B.Sc.	192
"Notes on the Treatment of Scarlet Fever by Antitoxic Serum," by VICTOR S. STONE, M.B., B.S.	194

REPORTS OF CASES—

"Infection in Tendon," by JOHN HOETS, M.B., Ch.M., F.C.S.A.	195
"Case of Hysteria," by F. W. SMITH, M.B., B.Sc.	195
"Bacillus Welchii Septicæmia," by RUPERT A. WILLIS, M.D.	196
"The Injection Treatment of Varicose Veins: Delayed Phlebitis," by RONALD DAVIDSON, M.B., F.R.C.S.	196

REVIEWS—

Lectures on the Central Nervous System	197
Progress in Therapeutics	197
Advances in Medicine	197
A Radiological Atlas of the Vertebrae	198
Hints for Junior Practitioners	198
Advice for Mothers	198

LEADING ARTICLES—

The Fifteenth Anniversary	PAGE.
	199

CURRENT COMMENT—

Tuberculosis of the Thyroid	200
The Non-Absorbable Suture	201

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Bacteriology and Immunology	202
Hygiene	203

SPECIAL ABSTRACT—

Iodine in Nutrition	204
-------------------------------	-----

BRITISH MEDICAL ASSOCIATION NEWS—

Scientific	208
----------------------	-----

CONGRESS NOTES—

Australasian Medical Congress (British Medical Association)	211
---	-----

OBITUARY—

Arthur Percy Wall	212
Oliver Penfold	212

DIARY FOR THE MONTH	212
-------------------------------	-----

MEDICAL APPOINTMENTS VACANT, ETC.	212
---	-----

MEDICAL APPOINTMENTS: IMPORTANT NOTICE	212
--	-----

EDITORIAL NOTICES	212
-----------------------------	-----

SOME MODERN ASPECTS OF THE CANCER PROBLEM.¹

By L. M. McKillop, M.B. (Sydney), F.R.C.S. (Edinburgh), F.C.S.A.,

Senior Honorary Surgeon, Mater Misericordiae Public Hospital, Brisbane.

I HAVE chosen the title of my address to you this evening feeling that I may be able for an hour or so to claim your attention in placing before your consideration some of the problems in the cancer question as I saw them at the recent International Cancer Congress in London to which I was the official Queensland delegate. Some of the matters to be discussed also claimed notice during my tour of the various cancer clinics in America, England and the European Continent and at the end of this paper I will show you three reels of a cinema film prepared at the Cambridge Research Institute by Dr. R. G. Canti, Pathologist to Saint Bartholomew's Hospital, which I purchased and brought back to Brisbane, and which were shown before the Surgical Section of this Branch on November 12 last. They tell in graphic form some of the story of the growth of connective tissue and of sarcoma in tissue artificially cultured and of the withering effect upon the latter of a single exposure to radium.

THE BIOLOGICAL CONCEPT OF CANCER.

The first consideration in the problem to which I wish to direct your attention, is that of the biological concept of the causation of cancer. Of all the serious disease with which we as a profession have had to deal for generations past, cancer has been one of the most unsatisfactory in every sense of the word. Subtle in its beginnings, relentless in its grip, resistant except to adequate and unsparring surgery in the early stages of its development, cancer has remained one of the unsolved mysteries of medical science and one of the greatest scourges of mankind. For many years past all sorts of theories have been held to account for its origin, but it is only during the past few years and especially since about 1923 that the curtain has, as it were, been pulled a little aside for us to peep behind and see at work the forces of Nature which are employed in the evolution of a cancer.

The cancer problem is, however, really a compound one, involving, as it does, considerations of causation, prevention and cure, but time will not allow of my touching, except lightly, upon the latter two aspects. In spite of a common belief to the contrary, it is extremely difficult with any degree of scientific accuracy to define a cancer. Ordinarily, it is defined as "a purposeless and persistent overgrowth of cells leading finally to a tumour which subserves no useful function in the body, but which tends to invade surrounding structures, to cause distant metastases and finally to kill its host." But certain malignant embryomata of

the kidney show on section a definite attempt to form secreting and excreting structures like glomeruli and tubules as can be seen in Figure I, a, a, a, and Figure II, a, b, b.

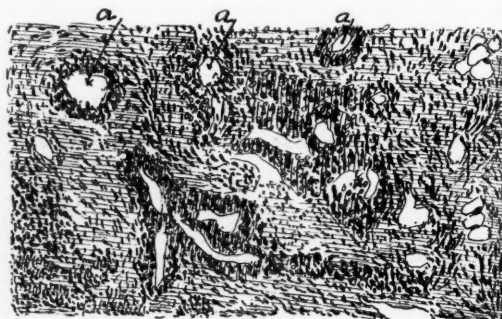


FIGURE I.
Drawing from Adeno-sarcoma of Kidney of a Child.

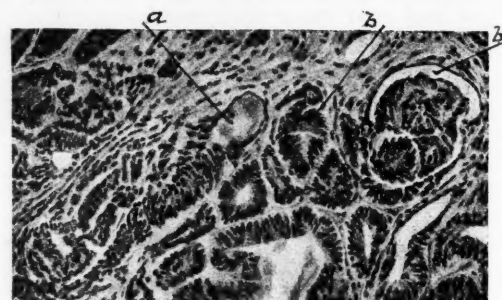


FIGURE II.
Embryona of the Kidney in a Child showing Attempt at Formation of Glomeruli. This is a more advanced stage than that shown in Figure I.

Moreover, as von Eiselsberg once pointed out, removal of the metastases of a thyroid carcinoma has been known to be quickly followed by the appearance of myxoedema in the patient. The metastases of primary carcinoma of the liver have been known to secrete bile and, lastly, we are all acquainted with the precocious sexual development occasionally seen in young children suffering from malignant adrenal tumours. From these examples we gather that true cancer may actually attempt to subserve some function of the body. Cancer, and I use the term in its widest sense to cover all forms of malignant disease, is not in its beginnings a constitutional or blood disease. Were it so, all our modern principles of treatment by surgery, radium, diathermy, deep X ray therapy *et cetera* would avail us little. On the other hand, we believe that cancers are of purely local origin and for the following good reasons:

1. Early and thorough removal of the affected area before dissemination has occurred permanently cures the patient.
2. The distant metastases of a primary growth show on microscopical examination all the structural characteristics of the cells of the organ in

¹ Read at a meeting of the Queensland Branch of the British Medical Association on April 5, 1929.

which the cancer arose, that is, they are usually true to type, columnar-celled cancer giving rise to columnar-celled deposits in the drainage glands.

3. In the relatively less malignant growths the cells of the metastatic deposits even attempt to form tissue more or less resembling the tissue of the parent organ. This is well shown in Figure III, which is an adeno-carcinoma of the female breast.

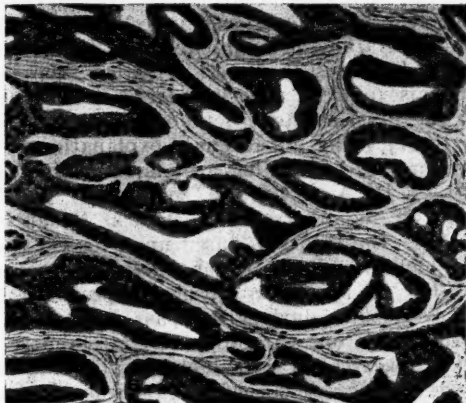


FIGURE III.
Adeno-carcinoma of the Breast.

4. Except with excessive rarity, cancers do not primarily break out simultaneously in multiple foci, nor do they then exhibit initially more than one type—carcinoma, sarcoma or epithelioma—at the site of origin, as one would expect if cancer were a constitutional disease. Certain cranks in, as well as outside of, the medical profession, have been for years trying to teach the public that cancer is but the local manifestation of a systemic disturbance, engendered by constipation and dietetic errors. I would remind them that successful extirpation of a malignant growth is not usually followed by a recrudescence or by the subsequent development of a totally different type of neoplasm, in spite of there being no alteration in the mode of life of the patient subsequent to the operation.

5. During the past few years many thousands of external cancers have been artificially induced in mice, rats and rabbits by the repeated application of certain carcinogenic agents, for example, radium, X rays of soft quality and tar compounds to the skin. Kennaway, of the Cancer Hospital Research Institute, has shown that the repeated application of an ether extract of acetylene tar to the skin of white mice is followed sooner or later by the appearance locally of an epithelioma in practically 100% of the animals. Now, obviously, all the mice of a long series cannot be assumed to have the same constitutional or hormone defect to account for the growths, for if a defect exists in 100% of animals over a long series, it surely must be a normal condition and not a defect at all! I feel that this *reductio ad absurdum* reasoning also explodes the

idea held by many research workers that the development of cancer is related to some endocrine defect.

Let us now turn to a consideration of the possible mechanism by which a group of normal cells can become converted into a cancer, using the term cancer as indicating malignancy and not merely malignant epithelial overgrowth. As Professor James Ewing, of New York, has pointed out, there are two considerations to be borne in mind in trying to explain the nature of malignant disease. One concerns the actual cause which appears to set in motion the sequence of changes finally ending in cancer. This is called the causal genesis and the view that one or other form of chronic tissue irritation by chemical, mechanical, radio-active, thermal, microbic or toxic agencies, is the exciting cause, is proved beyond all reasonable doubt, in that whatever residuum of evidence was lacking from clinical observation, has since in full measure been supplied by the information yielded by occupational cancers and by experimentally produced cancers. But the second problem in malignant disease is far more subtle, since it concerns the manner of the continued growth of cancer cells from the parent cancer cell, for, if we accept the evidence of experimental cancer, we are forced to admit that a perverted cell must have originally arisen from what was once a normal cell. This is what is called the problem of the formal genesis of cancer. It is here in this field that we are assailed on all hands by the various cancer theories. In trying to evaluate all such theories we are primarily handicapped by two very awkward considerations.

In the first place we know practically nothing of how a cell lives and reproduces itself. At the recent (September, 1928) meeting of the British Association for the Advancement of Science, at Glasgow, Professor A. V. Hill, of London, stated through Professor F. G. Donnan his belief that:

Life consists in the everlasting oxidation of cells. Life is a dynamic molecular organisation kept going and preserved by oxygen and oxidation: Death is but a natural breakdown of this structure, is always imminent and is only warded off by the cell structure preserving its capacity of oxidation. The living cell contains within itself the seeds of Death—called autolytic enzymes which are capable of hydrolyzing and breaking up the protein components of the cell protoplasm. As long as the cell lives, i.e. is oxygenated, these enzymes do not act.

A little later in the evening you will be able to see on the cinema screen a dying nerve cell undergoing dissolution.

In the second place the difficulty is that as yet no one has ever seen the original or primal cancer cell of a malignant new growth being "born," if I may be permitted to use such a term. No one has yet, so far as I know, observed the exact sequence of vital changes by which the causal irritant, for example, pitch or radium, has compelled a cell to cease living a useful and well ordered existence in the host's economy and so entirely to change its character as to become a menace to its neighbours, its descendants finally destroying the host.

Let us now assume that some suitable carcinogenic agency, radium, soft X rays, pitch and strong sunlight being amongst the best examples, is allowed to act upon an area of skin over a given length of time. What happens? At first nothing beyond hyperplasia and chronic inflammatory changes may take place, the tissue eventually returning to normal upon withdrawal of the irritant. This lesion we designate a possible precancerous condition. If, on the contrary, owing to increased potency of the irritant or to lessened resistance on the part of the tissues, a cancer eventually arises, its appearance is preceded by certain biological changes in the irritated cells.

First the irritant destroys sooner or later the cells of the superficial layer and the cells in the germinal layer below prepare to take their place. These reproduce themselves, come to the surface, are now the superficial layer and in turn are similarly destroyed. Again the cells of the new germinal layer reproduce themselves, come to the surface and are destroyed and so the process goes on. Figure IV will show graphically what I mean.

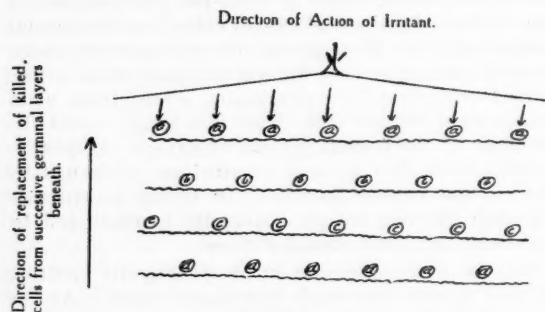


FIGURE IV.

The cells marked "a" before being destroyed, are normal. They are then replaced by the cells marked "b," which become the superficial layer and are in turn destroyed. Their place is taken by cells marked "c," from the third layer and so on. Each layer of cells, after being produced moves up. But the more layers are destroyed, the less mature are the cells which take their place, until finally there is reached a stage where the cells are purely embryonic and have lost practically every function except that of reproduction.

But, as every somatic cell of the body originally comes from the fertilized ovum (oosperm) whose primal function is division, subdivision and resubdivision, growth gradually merging into differentiation preparatory to function, it follows that as each group of cells comes to the surface and is there irritated, the nuclei must become progressively more embryonic. In other words, the reproductive capacity of each generation of cells must be more and more awakened until finally there are produced cells which have shed in whole or in part every other attribute except that of reproduction. High power magnification of cells which have arrived at this stage, now reveals a most interesting and significant state of affairs.

The chromosomes in the nucleus are considerably reduced in numbers and the cell now bears a rather striking resemblance to one of the sexual cells after

the latter has undergone what is called a "reduction mitosis"—the process by which the sperm sheds exactly one half of its chromosomes preparatory to penetrating the ovum, which of necessity must first also lose one half of its own chromosomes. By this fusion the total number of chromosomes in the oosperm is restored to the full complement and at once is begun the series of changes from which a new individual eventually springs. For some years past I have felt convinced that in this reduction in the number of chromosomes in cells subjected to chronic irritation there probably lies the secret of the formal genesis of cancer. This has been called the "semisexual cell mitosis theory" and my attention was first directed to the possibility of some such theory being an adequate explanation of the cancer process by reading an address delivered by Professor D. A. Welsh, of Sydney, at the 1905 meeting of the Australasian Medical Congress at Adelaide. The theory is based upon the researches in cell biology of E. B. Wilson whose work, together with that of Professor Farmer, appears to have been overlooked during the past few years. I believe that if one carefully correlates the results of this research in cell biology with the more modern evidences furnished by experimental cancer, a fairly strong case is made out for this theory. Cell biologists and biochemists have during the past few years spent in the aggregate considerable time and huge amounts of money in investigating the composition and physical characters of the manufactured article, that is, the actual cancer cell, and in studying the deviations from normal of the blood plasma of the cancer patient. I believe that any further inquiry along these lines is but a waste of time, energy and money, in so far as the aetiological problem is concerned. What is badly wanted is a further precise inquiry into the parenthood of the first few cancer cells in a particular cancer.

In terms of this theory which I will briefly put before you, Dr. Duhig and I propose to conduct an investigation into the changes associated with experimentally-produced cancer in animals and we hope that our inquiries and findings may throw much light upon this vexed problem, as the proposed investigation has never yet been carried out in any part of the world. I have had drawn up a diagram which will now be thrown upon the screen, and which I trust will help you to follow the possible sequence of changes (Figure V).

The cell—the product evoked by a long sequence of irritations—has had its chromosomes so reduced that it is in danger of being no longer able to perpetuate its species; to do so it probably joins up its nucleus with that of another similarly handicapped cell or of a leucocyte. The number of chromosomes in the compound cell is thus brought up to the number required to begin a new generation, the cell is now no longer what it was before, but is charged almost solely with the function of reproduction. It is an asexual gametocyte, if one may be permitted to use such a term. It is the

CHART EXPLAINING A THEORY OF GENESIS OF A MALIGNANT NEOPLASM.

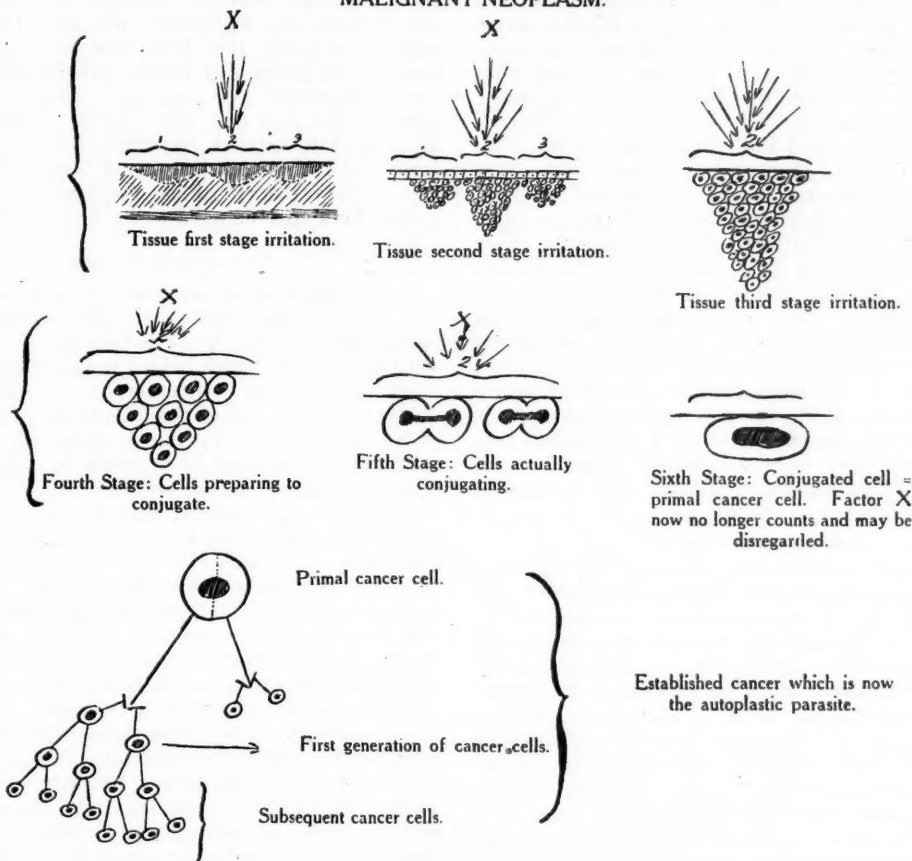


FIGURE V.

primal cancer cell. It subdivides and its progeny resubdivide *ad infinitum*, all its descendants possessing beyond everything else an inherent capacity for interminable reproduction. The cancer is now an established entity. Reproducing themselves beyond the limits of their food supply, the daughter cells finally invade the lymph or blood channels where increased nourishment often makes them subdivide more vigorously; the lymph glands become invaded and metastatic deposits form and it is usually from the depredations of these that the patient eventually succumbs. The cancer cell is now an autoplasmic parasite and removal of the causal irritant matters not, since there has been born within the tissues of the host a structure which can be likened to a clumsy attempt at the formation of another individual by a semisexual process. Put another way, a cancer is possibly a form of biological monster, produced as the result of the attempt upon the part of an irritated group of cells to perpetuate their kind when the irritant has not been of sufficient intensity to kill them outright. This theory is to me as adequate an explanation of the cancer process as is Ehrlich's side-chain

theory of the nature of immunity. Moreover, the theory is based upon the assumption that cancer is initially a purely local condition and I have already stated the reasons for this belief. It must be admitted that no one has as yet actually seen an irritated or precancerous cell being fertilized by the nucleus from another cell, but surely it would appear that some profound change must have taken place in the nuclei of the descendants of what was once a law-abiding cell to cause them to cast off all their functions except that sinister capacity of everlasting multiplication which is the essential characteristic of malignant disease!

In this connexion I would remind you that the Jensen mouse sarcoma has been kept alive by successive retransplantation for so many years that the total bulk of the cancer now exceeds by many thousands of times the total bulk of all the mice used in the experiments. To make thoroughly clear what is meant by this biological theory of cancer, it is advisable to review momentarily the embryology of the fertilized ovum (oosperm). Until the prepared ovum is penetrated by the head of the spermatozoon, the hand of nature is stayed. But

with their conjugation the number of chromosomes is restored to the full number characteristic of the species and immediately begins the wonderful series of changes which pass through the stages of primary division, secondary division and the differentiation of the cell mass into the three primary layers—epiblast, mesoblast and hypoblast—and finally ending up in the finished individual with all his complexity of tissues, structural and functional. Sets of cells are, however, in the process set aside to become the future germinal cells and they in turn, true to type, show mitotic nuclear divisions never seen in the ordinary or somatic unirritated cells of the body. Farmer, Moore and Walker many years ago found that at the primary site of origin and in a zone behind the advancing margin in malignant growths the cells of the tumour were dividing after the manner of the heterotypical mitosis of reproductive tissue. Does not this observation suggest to us that the parent cells of a malignant new growth may have been elaborated through some such semisexual process as I have just described?

Cohnheim's Theory.

As far back as 1868 Cohnheim pointed out that many tumours found their origin in groups of cells accidentally left in the process of development in situations to which they do not morphologically belong. These tumours are often exceedingly malignant. The majority of the neoplasms of the genitourinary tract begins in these embryonal "rests." Mixed tumours of the parotid gland, branchial cleft carcinomata and melanotic sarcomata are further instances of tissue "rests" giving origin to cancers. I would assume that the nuclei of cells lying in a tissue environment to which they do not normally belong, are unstable so to speak, and that it takes relatively little stimulation of such nuclei to reawaken in the cells the reproductive power they possess, and which has not been relegated to the background, as it were, by the exercise of some other function owing to the malposition of the tissue. On this assumption embryonic "rests" are potential cancers and clinical experience bears out this idea.

There are other theories used to explain the formal genesis of cancer. One of the more important is the "cell autonomy theory." This assumes that a normal cell possesses unlimited powers of growth which, past the needs of the body, are kept in check by some process of growth restraint, possibly some product of the endocrine system, and that if for any reason local exercise of this restraint is withdrawn, the involved tissue may grow enormously. For instance, no mammary new growth can approach in size the amount of growth present in a functional hypertrophy of the breast. Ribbert assumed that normal tissue ceases growing just when it should, because of the exercise of some normal growth restraint consisting of mutual pressure, demands for function, distribution of nutrient and the control of the organization. This

theory is also used to account conveniently for the transformation of benign tumours and inflammatory overgrowths into malignant tumours. I venture to suggest, however, that these and many more problems in the genesis of cancer can be explained by the "semisexual cell mitosis" theory, to which allusion has just now been made. I quite fail to see how, for instance, experimental cancer can be explained by the cell autonomy theory alone or in fact by any theory which assumes that cancer is caused by a specific parasite or by some nutritional error.

OCCUPATIONAL CANCERS.

It has long been recognized that some occupations are closely associated with the development of malignant disease. In 1775 Percival Potts pointed out that the soot which lodged in the rugose scrotum of chimney sweeps eventually set up epitheliomata. Many pioneer X ray workers have been prematurely called to their rest by the development of surface epitheliomata induced by exposure to the rays. Mule spinner's cancer of the scrotum is caused by the local effect of a special mineral oil used in the spinning looms in the English midlands as well as elsewhere. Tar epithelioma is seen on the dorsal aspect of the hands and on both aspects of the forearms of workers employed in handling pitch, tar, coke and their by-products. Aniline dye cancer occurs in the urinary bladder of persons employed in aniline dye works and it is now believed that the specific irritant, absorbed by the skin, is excreted by the kidneys, but causes cancer in the bladder, because that viscus harbours the urine longer than any other part of the tract. Primary cancer of the lung is now known to be definitely associated with certain forms of mining and on the Continent is definitely recognized as an occupational cancer. The list of occupational cancers could be extended considerably, but it will serve my purpose if I draw your attention to the fact that the study of the tissue changes in experimental cancers and occupational cancers (the two forms are practically one and the same thing) has thrown much light on the causal genesis of neoplasia. The rôle played in the production of malignant disease by agencies of radio-active type is most significant. The "soul," as it were, of the cell is the nucleus and we believe that radio-active substances act by hurrying the senescence of the cell by their influence upon the nucleus, specifically exciting cell reproduction at first in an orderly, but finally in a disorderly manner, thus tending to provoke the cell rebellion called cancer.

THE PREVENTIVE ASPECT OF THE CANCER PROBLEM.

The preventive aspect of the cancer problem furnishes a fascinating and profitable line of study in the problem and I make bold to say that, if we as a profession would take heed of the lessons taught, we could ultimately effect a very considerable reduction in the incidence rate of the disease. Let me quote two specific examples, one from each sex.

Cancer of the Mouth and Tongue.

In 1926 in England and Wales, 2,570 males, but only 433 females died from cancer of the buccal cavity. The disease is definitely associated with syphilis, mouth infection and smoking. Syphilis is a contributing factor by causing leucoplakia—a definitely precancerous condition of the oral or tongue mucosa. Mouth infection helps to keep up a condition of chronic epithelial irritation and smoking probably adds the last straw, in that it is now known that tobacco smoke contains distillation products from the tobacco leaves similar in their chemical grouping to soot, tar and mineral oils—all distillation products of coal tar and all definitely recognized as carcinogenic agents. Evidently if we are to reduce the incidence of cancer of the tongue and mouth, we must teach the public that any syphilitic manifestation must be treated thoroughly and promptly, dental attention must be given in order to correct broken tooth edges or dental sepsis and smoking must be avoided in the presence of leucoplakia or else we should encourage the use of a pipe with a juice-trap and a stem long enough to cause the smoke to drop its heavy distillates before they reach the mouth.

Cancer of the Cervix Uteri.

Cancer of the *cervix uteri* is almost confined to women who have had parturient lacerations of the cervix usually for a fairly long period. Here the mucosa of the lower part of the cervical canal becomes everted and after a period of chronic irritation from the low grade vaginal infection from which these women almost invariably suffer, the mucosa finally rebels and grows a cancer. The moral is that lacerations of the cervix which involve the mucosa of the cervical canal at all, should be carefully repaired while there is yet time. So can be avoided the possible, even probable, consequential cancer. The development of a cancer as the result of chronic irritation is usually a long drawn out process, the precancerous stage often lasting for years, but occasionally cases occur in which probably from some inherited or acquired defect in the local tissue resistance very malignant new growths arise quickly after exposure to the appropriate irritant.

I regret that time does not allow of my pursuing this consideration further, but, if I may be allowed to make a generalization, it is that cleanliness of the skin, mouth and alimentary canal, coupled with the avoidance of any recognized type of tissue irritant, will play a very important rôle in the prophylaxis of cancer.

THE TREATMENT OF CANCER.

In so far as the progress and treatment of cancers are concerned, every case must be considered on its merits. Each individual cancer patient must be looked upon as a study. We have to bear in mind that the progress of any cancer is largely regulated by considerations of the type of malignancy, as the cell differentiation reported by the pathologist in a

tissue biopsy, if such can be obtained without risk of dissemination; the physique, age and family history of the patient and the facilities available for applying the type of treatment, simple or combined, best suited to the individual requirements of the condition. Early and radical surgery remains our sheet anchor in the treatment of cancer and it is probable that it will remain so for many moons to come. But the efficacy of good surgery depends in turn directly upon the stage at which the patient comes for treatment and this in turn must ever largely revolve around the question of public education in cancer facts. The lateness with which so many cancer patients come to us for treatment, must surely reflect upon us as a profession, for to whom but us is the public to look for guidance and advice in a matter of such moment as this?

Lead Treatment.

May I now briefly refer to one or two of the more modern aspects of treatment. First, the lead treatment of Blair Bell. Like Dr. Graham Brown who, I understand, recently addressed the Branch on this matter, I was received with the greatest courtesy and consideration by Professor Bell and nothing was hidden from me. I discussed the treatment with others also in Liverpool, London, on the Continent and in the United States and in reports to the Government of Queensland and to the Cancer Campaign Committee I have condemned the lead treatment. But this does not mean that I have condemned the principles of chemotherapy which underlie this form of treatment. I simply believe that if any metal or metal and organic compound is going to cure cancer, it cannot continue to be lead which will be employed. But I confess that I cannot see eye to eye with those who maintain that, because Ehrlich eventually succeeded in finding in "Salvarsan" a compound definitely toxic to the treponema of syphilis, Blair Bell or someone else may find some metallic preparation which will be definitely toxic to the cancer cell and yet spare the normal tissues. For the analogy is based on false premises, because the spirochæte is a stranger introduced into the sanctity of the tissues from the outside world, whereas I believe that the cancer cell is but the final product of misdirected biological processes in the tissues themselves. Hence it is difficult to conceive of a substance which will definitely kill a cancer cell and not damage the tissue cells from which it originally arose. However, I have for Blair Bell the greatest respect and admiration.

Treatment by Radium.

In radium we have a very powerful weapon in the fight. It is only during the last couple of years and largely as the result of the work of Thomas Lumsden that we are beginning to understand how this agent influences a cancer cell. Its action is probably twofold: (i) The γ rays deal a death blow at the nucleus of the embryonic cancer cell and directly kill all such cells within a certain radius of its action, as you will see in a few minutes on the

cinema screen. (ii) In the peripheral zones of its action, radium damages cancer cells and from these dying cells antibodies, we believe, are produced which inhibit the nuclear activity of the multiplying cancer cells and also provoke the production of fibrous tissue which helps to wall in and localize the further progress of the cancer cells. But when we use radium, we should speak not of cure, but of apparent arrest of the cancer. Some such antibody formation is also believed to occur following the use of deep therapy.

In America much work is being done in the simultaneous use of radium and X rays and I consider this research likely to yield highly important results. Radium, of course, has won its spurs in the treatment of oral and laryngeal cancer and cancer of the *cervix uteri*. It is also possible that a cancer serum activated by radium may yet be prepared and the disease thereby treated by intramuscular or intravenous injections. I understand that Dr. J. V. Duhig hopes to try this idea.

Cancer Immunity.

It is believed that, as a cancer grows, it gradually begins to set up its own active immunity by the formation of antibodies, but unfortunately the disease almost invariably kills the patient before the immunity is of such a degree as to limit the further progress of the cancer. In the exceptional instances in which true spontaneous cure of cancer occurs (and I know of two cases in my own practice) the immunity outstrips the cancer. Lumsden believes that the antibodies are activated by a substance produced from the lymphocytes. If so, this may help to explain the invariable presence of lymphocytes at the actively growing edge of a cancer, as they can hardly be there solely on account of the irritation produced by the growth itself.

Who knows but that we may not yet be able to take protective advantage of the immunity produced by a neoplasm by purposely setting up a superficial cancer by means of one of the known carcinogenic agents and then completely excising the growth after allowing sufficient time for the immunity to develop, but before the danger of dissemination has arisen.

CONCLUSION.

Let me say in conclusion that while I believe we are on the eve of very important discoveries in the causation and treatment of cancer, we should direct our energies for the present towards teaching people that cancer in its beginnings is a purely local condition, that it never arises in healthy tissues, that it is usually permanently arrestable (even curable) if treated at an early stage and that periodic physical examination is highly desirable in the early detection of cancer and of many other serious conditions.

In this brief address I feel I have touched only upon the fringe of very important considerations in the fascinating problem of cancer and I thank you for having borne with me so patiently. If I have

interested you I shall feel that our evening has not been spent in vain.

BIBLIOGRAPHY.

- James Ewing: "Neoplastic Diseases."
James Ewing: "The Aetiology of Cancer," International Cancer Congress, 1928.
G. W. Nicholson: "The Nature of Tumour Formation," British Empire Cancer Campaign Report for 1928.
W. Blair Bell: "Chemotherapy in Malignant Disease, with Special Reference to Lead," International Cancer Congress, 1928.
D. A. Welsh: "Some Recent Observations on Cancer and Tumour Growth," Australasian Medical Congress, 1905.
Burton T. Simpson: "Discussion on the Lead Treatment of Cancer," International Cancer Congress, 1928.
George A. Soper: "The Value of Public Instruction in the Control of Cancer," International Cancer Congress, 1928.
E. H. Kettle: "The Pathology of Tumours," 1925.

TWO OLD MIDWIFERY BOOKS.¹

By CONSTANCE E. D'ARCY, M.B., Ch.M. (Sydney),
Lecturer in Clinical Obstetrics, University of Sydney;
Honorary Surgeon, Royal Hospital for Women,
Sydney; Honorary Gynaecologist, Saint
Vincent's Hospital.

THE title page of the first of the two books about which I intend to speak, "The Diseases of Women with Child and in Child Bed," by Francis Mauriceau (translated by Hugh Chamberlen, M.D., Sixth Edition, 1727) announces that it contains:

The best means of helping women in Natural and Unnatural Labours, with fit Remedies for the Several Indispositions of the New-born Babes, to which is prefixed An Exact Description of the Parts of Generation in Women—a book much more perfect than any now extant, and very necessary for all, especially Midwives and Men practising that Art. The Sixth Edition corrected and augmented with several new figures, and with the description of an excellent instrument to bring a child that comes right; all correctly engraven in Copper. The Edition was printed by T. Cox, at the Lamb, and J. Clarke at the Bible, under Royal Exchange in Cornhill; and T. Combes at the Bible and Dove, in Pater-Noster Row. MDCCXXVII.

The book opens with the author's epistle dedicatory to "All my dear brethren, the Sworn Master-Chirurgeons of the City of Paris." The author used a flowery style and deemed it necessary for a chirurgeon to make abject apology for descending to the subject of the indispositions of women with child and in child bed, as the following quotation shows:

I shall refrain, Gentlemen, the praising you upon this subject, for (besides it's deserving a pen more able than mine to acquit itself according to your merit) I fear, I shall be silenced for so doing, by such as would alledge, that with which he once was reproached, who undertook to praise Hercules, by publishing his Heroick Actions to the people of Lacedaemonia; Who (answered one) does not know him? and esteem him to be in the Number of the immortal Gods? So likewise may it be said to me; Who knoweth not the Master-Chirurgeons of Paris? Is it not manifest that you are the fruitful spring to which they come from all Places of Europe, to draw the Perfection of so fair an Art. . . . But tho' in those Exercises, so ordered by you, we discourse not usually of Women with Child, nor of their different Labours; yet, thinking to discharge

¹Read at a meeting of the Section of Medical History and Literature of the New South Wales Branch of the British Medical Association in February, 1929.

myself of my Duty, I hope you will not judge amiss of my publishing this Book to the World, which I present to you. . . . being persuaded it may be profitable to young chirurgeons living in the Country, where but few sufficiently instructed in all things necessary to be known, can be met with Accept then, Gentlemen, this small Production of one of your Children, who conjures you, by the love of Fathers, (that never disown their Children how deformed soever) to defend it against Envy and Detraction, which will never dare to attack it, when vouchsafed your Protection.

Then follows a letter after the manner of the time, from author to reader, in which he writes:

I have bound myself to acquainting you with Truth, of which I hope you will have more satisfaction than had I always blindly followed the Thoughts of others but in all this you find some of my sentiments not so satisfactory, or others (in your opinion) not fully agreeing with Truth; remember, that, as among the best Corn, there spring tares, or other weeds, so you meet with few Books so clear, as not to reject something in them; and if I hope for Respect from you in recompense of my Pains, it may be but what you may have had for others who never had, on this occasion a greater Desire than myself to serve you.

Both these letters are undated, but there follows:

The Approbation of the four Sworn Provosts and Wardens of the Master-Chirurgeons of Paris—a certificate signed at Paris, March 15th, 1668.

An extract of King's Privilege given at St. Germain on June 10, 1668, gave Mauriceau what we would now call copyright of all matter and figures of "the said Book of the space of Ten Years, upon the Confiscation of the Counterfeit Copies and 300-L."

The translator then addresses the "Courteous Reader." I quote the first paragraph:

Having long observed the great want of necessary Directions how to govern Women with Child and in Child-bed, and also how new-born Babies should be well ordered, I designed a small Manual to that purpose; but meeting sometime after in France with this treatise of Mauriceau (which in my opinion far exceeds all former Authors, especially Culpeper, Sharp, Speculum Matricis, Sermon &c., being less erroneous, and enriched with divers new observations) I changed my Resolution into that of translating him.

The position of the male practitioner at that time is reflected in later passages in this letter. Midwifery was in the hands of women almost exclusively and they were for the most part ignorant and uneducated. The male practitioner was called in only for destructive operations and the midwives maintained an attitude of hostility to the newcomers, who were known as men-midwives, mid-men, or andro-bathogynists. Herbert Spencer in the Fitzpatrick Lecture on the History of British Midwifery (1650 to 1800) says that:

The opposition of the midwives during the transition period was naturally great, and according to the fashion of the time, accompanied by such phrases as "great-horse-god-mother-of-a-he-mid-wife"—the shaft levelled at Smellie by Mrs. Nihell. He tells also that when George IV was born, the Queen was attended by Mrs. Draper, while William Hunter remained in waiting in case his help should be required to deal with complications.

The reading of our translator's letter also brings to mind the fact that midwifery forceps were invented by Chamberlen. The credit is usually given to Peter Chamberlen, the Elder, who is prob-

ably the father of Hugh Chamberlen, the translator of this book. Peter Chamberlen was a barber-surgeon, a distinguished obstetric practitioner and physician to the Court, who died in 1631. The forceps were kept a family secret and the original pair used by Peter, the Elder, was discovered in 1813 in a secret space under the floor of a closet in Woodham Mortimer Hall, near Maiden in Essex, formerly the residence of Dr. Peter Chamberlen, a nephew of Peter the Elder.

It is a matter of interest to note the somewhat shame-faced apology the translator, Hugh Chamberlen, makes in this foreword, for the secrecy observed by his father, his two brothers and himself about their new-found beneficent forceps and a naïve advertisement for himself and family is not a little amusing. Read what he writes:

In the seventeenth chapter of the Second Book, my Author justifies the fastening Hooks in the Head of a Child that comes right, and yet because of some Difficulty or Disproportion, cannot pass; which, I confess, has been, and is yet the Practice of the most expert Artists in Midwifery, not only in England, but throughout Europe, and has much caused the Report, that where a Man comes, one or both must necessarily die, and is the reason of forbearing to send till the child is dead, or the Mother dying. But I can neither approve of the Practice nor these Delays, because my Father, Brothers and self (tho' none else in Europe as I know) have by God's blessing and our Industry, attained to, and long practised a way to deliver Women in this Case, without any Prejudice to them or their Infants; tho' all others (being obliged for want of such an Expedient, to use the common way) do, and must endanger, if not destroy one or both with Hooks. By this manual operation a labour may be despatched (on the least Difficulty) with fewer Pains, and sooner, to the great Advantage, and without Danger, both of Woman and Child. If, therefore, the use of Hooks by Physicians and Chirurgeons be condemned, (without thereto necessitated thro' some monster's Birth) we can much less approve of a Midwife's using them, as some here in England boast they do; which rash Presumption, in France, would call them in Question for their Lives . . . I will now take leave to offer an Apology for not publishing the Secret I mention we have to extract Children without Hooks, where other Artists use them, viz., there being my Father and two Brothers living, that practise this Art. I cannot esteem my own to dispose of, nor publish it without injury to them; and think I have not been unserviceable to my own Country, altho' I do but inform them that the forementioned three Persons of our Family, and my Self, can serve them in these Extremities with greater safety than others.

The pages on anatomy of the female pelvis show that the French were far behind English anatomists at this time, so much so that Hugh Chamberlen interposes his own account which in the main coincides with what we know today. A chapter on sterility brings a sharp realization of the different attitude of mind then existing to that of women in these Stopesian days.

The date of the book is again indicated in the same chapter in the following passage:

Barrenness also proceeds from the whole Habit of the Body, or when a woman is too old, or too young; for the seed of the young is not yet prolifick, neither have they the menstruous Blood; two things requisite to Fruitfulness; and that of the Aged is too small in Quantity and too cold; they, likewise, want the menstruous Blood. An universal Intemperature (though the woman be of con-

venient years) renders them however barren, as when they are hectic, hydropic, feverish and sickly, and especially so much the more as the noble Parts are fallen from their Temperament and Natural Constitution. There are many who seem Barren for a long time, because of some of the forementioned Reasons, yea, till they are thirty-five or forty-five years old, and sometimes longer, who yet, at last, conceive, being cured of the Indispositions which hindered them, and having changed their Temperament by age, of which we have had a remarkable example in the Person of the Queen Mother, lately deceased, who was above twenty-two years married, and without children, and yet afterwards, to the great Joy and Content of all France, she had our invincible Monarch, Louis XIVth, now reigning.

And so through the pages one passes and reads of how to manage a mole and hæmorrhage and many of the accidents of child-birth we are all familiar with. The author strongly condemned Cæsarean section, except after the death of the mother. He writes:

There are many good women who, for having only heard some gossips speak of it, are very confident that they know such and such yet living whose sides had been so opened to fetch the Child out of their Belly. Nay more, there are some who affirm they know those who have had this operation practis'd on them three or four times successively, and yet alive; and the better to confirm so notable a lye, which they had only heard recited by others, and after having three or four times told it, believe it themselves for truth, as much as if they had seen it with their own eye, will tell so many circumstances and Particulars, that they easily persuade those into a Belief that do not understand the Impossibility of it. There are others again, who shewing the scars of some abscess they have had in their Belly, would persuade that a Child hath been taken out there; to which purpose I will relate what once saw myself, concerning a big-belly'd woman that was in the Hostel de Dieu, at Paris, when I there practis'd Deliveries. This Woman, whether thro' Cunning, Feigning, or thro' Ignorance really believing it, did testify to all the women who were there in the said Hostel de Dieu, as also to an infinite number of other Persons, and among the rest to a good old Nun that govern'd all, whom they called Mother Bouquet (and at that time did preside in the Hall of Deliveries, like another Goddess Lucina) that she was very much afraid they must open her side to deliver her, as it had been two years before; in all which Time she had made the same Relation to above a thousand several Persons, each of whom, it may be, had again related it to as many more; shewing to all of them a great scar, by which she said the Chirurgeons had drawn the Child out of her Belly. Wherefore, she pray'd Mother Bouquet to recommend her to me, desiring rather to be delivered by me who was a Chirurgeon, because she might be more safely helped in such a Business, than by a Midwife. . . . and immediately she caus'd her to be fetched, who told me the same she had related to her . . . and at the same time she shew'd me a great scar, situated just on the Right side of the Breast, about the middle of the Ribs, where she had a great abscess, of which this scar remained. And when I told her that the Breast was not the Place where a Child should be fetch'd, and that I had with my Arguments convinc'd her of the Impossibility of what she had believed, and made others believe, as the Women of the Hostel de Dieu, and Mother Bouquet also, they began to be disabus'd, and continu'd so, when three Days after this Conference I had deliver'd her with the greatest facility, altho' it was a very great Child which came quickly.

He gives instructions for *post mortem* Cæsarean section and writes:

There are some who, when the Woman is just dying, would have somewhat put between her Teeth to keep her Mouth open, and likewise in the outward Part of the Womb, to the end the Infant receiving by this means some

little air and Refreshment, may not be so soon suffocated; but all this Mystery will avail very little, because the Child lives only by the Mother's Blood, whilst it is in the Womb, but if he will needs do so, it is rather to content the Company, than out of any belief of the good it will do.

It is to be noted that the latter part of this volume is less well thumb'd than the earlier part. The later chapters are devoted to the care of the child. In a chapter are the requisite and necessary conditions in the choice of a good nurse. The author mentions some of the conditions which make such a one necessary.

Those who will not, or cannot, suckle their own children, whether it be to preserve their Beauty, as all Persons of Quality and most of the Citizens do; or that their Husbands will not suffer them, nor be troubled with such a Noise.

The book finishes with a noble period:

In fine, Loving Reader, I believe I have now acquitted myself of my Duty towards the Publick, in communicating the Knowledge which God hath graciously bestow'd on me concerning the Diseases of Women with Child, and in Child Bed. I pray God, the Fountain of all Science, that he will vouchsafe to teach you the right way of helping them and their Children in these Cases; and make you yet better able to conceive these things, than I have here explain'd them; and that all may be ever to his Greater Glory.

I now pass to William Smellie's book which is, indeed, a masterpiece, "Collection of Preternatural Cases and Observations in Midwifery" (Volume III, A New Edition, 1779).

William Smellie was born in Lanark in 1697. He studied medicine in Glasgow and began to practise in Lanark in 1720. He first heard of forceps in 1735. (They seem to have come into fairly general use in England about 1733.) He saw the possibilities of the instrument and decided, as so many of his countrymen have before and since, to move south. He became a famous obstetrician and teacher in London. He was the first to use forceps on the after-coming head in breech presentation. His name is familiar to all as applied to the "Smellie grip"—still the best method of delivering the head in breech cases. He measured the pelvis and was the first to estimate the diagonal conjugate. Herbert Spencer speaks of him as the Master of British Midwifery and Fashbender says of him: "One of the most important obstetricians of all times and countries." Having achieved great success in London, in due course in 1759 he retired and returned to his native country. He spent the remainder of his life at his property, "Smellom," Lanark, writing notes of his cases for publication. In this work he had the invaluable aid of Tobias Smollet. He died in 1763.

The inter-leather binding of the book under review is inscribed "Smellie's Midwifery."

The title page reads:

A Collection of Preternatural Cases and Observations in Midwifery, by William Smellie, M.D., completing the design of illustrating his First Volume, on that Subject. Vol. III, A New Edition—London—Printed by W. Strahan, T. Cadell and G. Nicoll, in the Strand; and W. Fox and S. Hays, in Holborn. MDCCLXXIX.

In the foreword it is made clear that this third volume, added to two former volumes, completes a

system of midwifery and is genuine, although published after the death.

The manuscript was transmitted to the person who prepared the two former volumes for the press, and even delivered to the printer, when the Doctor died advanced in years, at his own house, near Lanark, in North Britain.

One can recognize Smollett's full flavoured humour and his realism, as one reads the pages. The subject matter is Smellie's, but the manner of telling is Smollett's. I quote the note of a case.

The body pulled from the head and left in the vagina, 1724.

A midwife who had never had any education, and who had formerly vaunted that she always did her own work, and would never call man to her assistance, was called to a case, in which the child presented wrong. After she had, with great difficulty, brought down the body, she could not deliver the head, from the woman's being of a small size, and the child large. During the time of her making these trials, the husband sent in great haste for me. In the meantime, when the midwife found that her endeavours were in vain, she rested to recover from her fatigue, and told those who were present, that she would now wait for the assistance of the woman's pains. One of the servants seeing me at a distance, went in in a hurry, and told her I was come. She, not knowing that I was called, fell to work immediately, and pulled at the child with great force and violence. Finding, as she imagined, the child coming along, she called out, that now she had got the better of him. The neck at that instant separating, the body was pulled from the head, and she fell down on the floor. As she attempted to rise, one of the assistants told her that it wanted the head, a circumstance that shocked her so much (being a woman of a violent disposition) that she was immediately seized with faintings and convulsions, and obliged to be put to bed in another room. I just then arrived, and was surprised to find the house in such confusion.

He goes to detail how he delivered the head with the aid of a crotchet, and concludes:

After having extracted the placenta, and put the woman into an easier position in bed, I went and recovered the midwife, by giving her some volatile spirits in water. The child appeared to have been dead several days; and I was persuaded, that if the neck had not given way, but had stood another pull, the head had been delivered. This accident was lucky for me, and rendered the midwife more tractable for the future.

Let us now read, so as to compare style, a page from the "Adventures of Roderick Random," by Tobias George Smollett, making full allowance, of course, for Smellie's restraining influence in his own text book. Roderick had been apprenticed to Mr. Launcelot Crab, a surgeon, whom he describes as follows:

This member of the faculty was aged fifty, about five feet high, and ten round the belly; his face capacious as a full moon, and much the complexion of a mulberry; his nose, resembling a powder horn, was swelled to an enormous size, and studded all over with carbuncles; and his little grey eyes reflected the rays in such an oblique manner, that while he looked a person full in the face, one would have imagined he was admiring the buckle of his shoe. He had entertained an implacable resentment against Potion, who, though a young practitioner, was better employed than he.

That Smollett had some inside knowledge of the obstetrical arts is shown a little farther on in the same book:

But a small accident which happened about this time determined him (Crab) in my favour. This was no other than the pregnancy of his maid-servant, who declared her

situation to me, assuring me, at the same time, that I was the occasion of it. Although I had no reason to question the truth of this imputation, I was not ignorant of the familiarities which had passed between her master and her; taking the advantage of which I represented to her the folly of laying the burden at my door, when she might dispose of it to much better purpose with Mr. Crab. She listened to my advice, and next day acquainted him with the pretended success of their mutual endeavours. . . . He, therefore, took a resolution worthy of himself; which was to persuade the girl that she was not with child, but only afflicted with a disorder incident to young women, which he would easily remove. With this view (as he pretended) he prescribed for her such medicines as he thought would infallibly procure abortion The maid, being advertised by me of his design, and at the same time, well acquainted with her own condition, absolutely refused to follow his directions.

I am sure you want to know the end of this little tragedy, which was, that Roderick achieved his aim, namely, to be released from his bond with Mr. Crab. His hasty going would proclaim his guilt, so Mr. Crab's face was saved in front of Potion and his friends:

And accordingly I (Roderick) set out in a few weeks for London, my whole fortune consisting of one suit of clothes, half a dozen ruffled shirts, as many plain, two pairs of worsted, and a like number of thread stockings, a case of pocket instruments, a small edition of Horace Wiseman's "Surgery," and ten guineas in cash, for which Crab took my bond, bearing five per cent. interest.

Some of Smellie's success in practice must surely have been due to his apparent capacity for understanding and managing women, whether patients or midwives. At the end of his book he published notes of cases, showing his wisdom in handling difficult situations needing tact and also indicating the power of the midwives. He heads the list "Collection '59. With respect to Men Practitioners," and then follow his words of wisdom:

I was one night called very late to a woman of my acquaintance in the neighbourhood. I was not a little surprised, when I came into the room, to hear two women scolding one another in a ferocious manner, and ready to come to blows. As they did not know of my being sent for, my appearance surprised and silenced them for the present. I soon found they were two midwives of my acquaintance. I said nothing, but spoke to the patient who was in bed. The midwife that was sitting on the bedside desired me to take a pain, saying she would yield her seat to me; but to no midwife in London. When I examined, I found the child presenting right, the os uteri soft and pretty much dilated, and the membranes entire. I then desired the two midwives to go into the next room, where I heard both their complaints. One had been bespoke; but was engaged when sent for, on which the other was called. I again went to the patient, told her she was in a very good way, and asked which of them she chose for her midwife. She said the one who was bespoke, for she was afraid of the other. I made them acquainted with this decision, but advised her that came first to yield, because if any accident should happen, she would be blamed, and I told her she would be paid for her trouble. Thus ended the contest and both were pleased.

Surely this is a model for round-table disputes and for harassed nurses' associations these days. He tells the story of a certain

Mr. W. who attended a woman in labour of her first child. He had gained reputation from being called to assist midwives in the country in preternatural cases, but this being the first time of his being bespoke to attend by himself, he was at a loss how to manage his patient in a natural case . . . He continued every now and then to assist delivery for several hours to no purpose. The nurse,

a sensible woman who had many years in that business, exhorted him from time to time to rest and not fatigue himself. . . . This was in December, 1748. He had attended one full course of lectures about three years before, but had not attended the labours, imagining everything in midwifery trifling, and that the lectures on the extraordinary cases were sufficient.

Another gentleman was called in, when a quarrel ensued, and Dr. Smellie finally came. The record of the case ends with:

Both these gentlemen have since that time attended several courses of my lectures, as well as all public labours that happened during their attendance; and have often acknowledged my friendly behaviour in this case, by which they were prevented from exposing their ignorance.

The manner of dress worn by gentlemen who hid forth to practise the gentle art of midwifery is described in the following extract:

In the year 1748, I received a message from a lady, to go to one who had been her servant, and was married to a tradesman. On my arrival, I found another practitioner there, who seemed much surprised, and with a very surly countenance, scolded the husband for bringing another without his knowledge.

His dress was as forbidding as his countenance, consisting of an old greasy matted wrapper, or night-gown, a buff broad sword-belt of the same complexion round his middle; napkins wrapped round his arms, and a woman's apron before him to keep his dress from being daubed. At the same time, to make him appear of consequence, he had on his head a large tie periwig.

One is filled with respect and admiration for the earnestness of this man who laboured with such wonderful success under such adverse conditions and if at times it seems very amusing, one can only surmise what our present day writings may seem like two centuries hence.

I will conclude with the relation of "The Cæsarian operation performed with success by a midwife; described by Mr. Duncan Stewart, Surgeon in Dungannon, in the County of Tyrone, Ireland" and with the account of Smellie's own case following.

The histories of the Cæsarian operation being so few, I send you the following: Alice O'Neal, aged about thirty-three years, wife to a poor farmer near Charlemont, and mother to several children, in January, 1738-9, was taken in labour, but could not be delivered of her child by several women who attempted it. She remained in this condition twelve days. The child was thought to be dead after the third day. Mary Donally, an illiterate woman, but eminent among the common people for extracting dead births, being then called, tried also to deliver her in the common way; and her attempts not succeeding, performed the Cæsarian operation, by cutting with a razor, first the containing parts of the abdomen, and then the uterus, at the aperture of which she took out the child, and secundines. . . . She held the lips of the wound together with her hand till one went a mile, and returned with silk, and the common needles which tailors use. With these she joined the lips in the manner of the stitch, employed ordinarily for the harelip; and drest the wound with whites of eggs, as she told me some days after, when led by curiosity, I visited the poor woman who had undergone the operation. The cure was completed with salves of the midwife's own compounding. In about twenty-seven days, the patient was able to walk a mile on foot, and came to me in a farmer's house, where she shewed me the wound covered with a cicatrice; but she complained of her belly hanging outwards on the right side, where I observed a tumour as large as a child's head; and she was distressed

with a flour albus, for which I gave her some medicines, and advised to drink decoctions of the vulnerary plants, and to support the side of her belly with a bandage. The patient has enjoyed very good health ever since, manages her family affairs, and has frequently walked to market in this town, which is six miles distance from her house.

Taking courage from this Smellie determined to try section when a suitable case arose. He writes:

I was sent for to — Paterson, a drummer's wife in the Canongate, June 28, 1737, about ten that night, who had been in labour for six days. She was one of the least women I ever saw, and prodigiously deformed.

I touched her, and found something in the vagina so large, that I at first took it for the head of the child. . . . What I at first took for the head proved to be the Os Coccygis, of a very extraordinary size and shape, turned inwards quite cross the vagina, and reaching almost to the fore-part of it. The woman being much fatigued with pain and want of sleep, I ordered an opium pill to procure rest. . . . I promised to pay another visit soon, and to bring some of my brethren along with me, and to give her all the assistance we could.

Accordingly, several of my brethren visited my patient along with me, viz., Drs. John Lermont, Mr. Drummond, surgeon and man-midwife, &c., who were unanimously of opinion that the child could never be brought through the vagina, and that the only chance she had for life, and even that a very small one, was to undergo the Cæsarian section. . . . Accordingly, ten at night was appointed for the operation. The following gentlemen were present: Dr. Monro, Professor of Anatomy, Dr. John Lermont, Dr. James Dundass, Mr. Drummond, Mr. Osburn, Mr. Gibson, Mr. Douglass, Surgeons.

The instruments and dressings, as follows: (1) A common scalpel; (2) A pair of crooked scissors; (3) Two needles, threaded; (4) Four large needles threaded for the Gastroraphia; (5) Scraped lint; (6) A large compress, napkin and scapulary; (7) Ink; (8) A cordial to be given during the operation.

The patient was laid on her back on a table covered with blankets, with a pillow below her head. Her body being secured, I seated myself at her right side. I drew a line with ink about six inches in length, parallel to the Linea Alba, and four inches distant from it, in order to avoid cutting the musculus rectus. I then with a convex scalpel made an incision along the black line, thro' the integuments and fat. In the middle of the section I gently cut thro' the muscles and peritoneum, so as to get in the fore-finger of the left hand, upon which with the crooked scissors I enlarged the wound upwards and downwards, equal to the black line I had made on the skin. . . . I then cut into the uterus, and tore the membranes containing the child; but as the child was large I found the incision in the Abdomen too small, I was obliged to enlarge it upwards to the short ribs, and downwards to the Ossa Pubis, the Uterus in proportion. I then extracted the child without any violence, afterwards the Placenta and the membranes. . . . The child was dead but quite fresh. I reduced a little of the gut that came down, and made the Gastroraphia at three stitches without any peg.

After the first stitch the gut gave me no more trouble. I covered the wound with soft pledgets, applied a large compress, and over all the napkin and scapulary.

The poor woman bore the operation with great courage. . . . She did not lose above four or five ounces of blood during the operation. In the night she bled a little, but it stopped before I got to her. She had not slept, but was otherwise tolerably well. Next day I visited her, she told me she had had some slumbers in the morning. About twelve o'clock she complained of sickness at her stomach, with an inclination to vomit; her pulse was then very frequent and small. She gradually grew weaker and weaker, and died about four in the afternoon. There came not away above two teaspoonfuls of blood from the vagina. The Uterus was at least one inch and a half thick.

How one wishes for Smellie's sake that Mistress Paterson had lived!

AN EASILY CONSTRUCTED INTRATRACHEAL ANÆSTHETIC APPARATUS.

By A. B. KEITH WATKINS, M.S. (London), F.R.C.S. (England),

Honorary Ear, Nose and Throat Surgeon, Newcastle General Hospital, Newcastle, New South Wales.

Now that the merits of intratracheal anaesthesia for special types of work (operations in the upper air passages, in the thorax *et cetera*) are being more universally understood, many anaesthetists will appreciate the opportunity to procure an apparatus for the procedure at a very moderate cost.

The apparatus here described is of simple design, is compact, has a one lever control and will not need the application of heat under any Australian conditions. The tank is deep enough to make splashing unlikely and, as it is subdivided by transverse vanes which further diminish splashing, a safety chamber as an ether trap is rendered unnecessary. Its great merit, however, is that all the parts used in its construction are manufactured for other purposes and can be purchased cheaply. The cost of the parts is in the region of three pounds. The assembling of the set can be easily performed by anyone handy with a soldering iron. Except for making the manometer and glass tube for the blow off, the work is almost entirely that of a tinsmith and such an artisan should be able to assemble the set in a few hours.

Figure I demonstrates the principle only of the apparatus; the photographs, especially Figure IV, show the actual way the principle is carried into effect. Air enters the air inlet (Figure I) and what

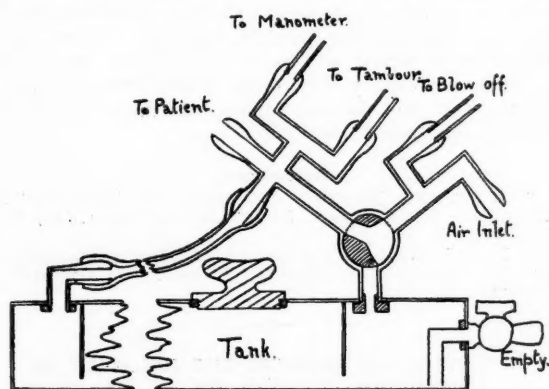


FIGURE I.

Diagram, Showing Principle of the Apparatus.

is not required, escapes down the side arm to the blow-off. The residue passes through a three-way tap. In the position of the tap shown in the diagram the whole of the air passes through the tap and on to the patient, though the pressure is registered *via* a side arm passing to the manometer and tambour. In another position of the tap, the whole of the air, instead of passing directly to the patient, passes into the ether tank and, after traversing the surface

of the ether, leaves the tank at the tap at the other end and then goes through a short rubber tube and thence to the patient. In intermediate positions of the tap, varying proportions of air pass both ways. The tap to empty the tank has an angle piece behind it which opens close to the floor. Thus, if a rubber tube be attached to the tap and syphon action be used, the tank is emptied in a few seconds. The three-way tap used is a motor car "Ajax" extra air accessory. The rotating piece inside has to be filed a little so that the opening to the tank is just closed when the opening to the patient is fully open (Figure I) and *vice versa*. It must also be filed to prevent there being any obstruction to the air inlet in all positions between full air and full ether.

The complicated mass of tubes (Figure IV) are ordinary brass gas fittings (tee pieces, angle pieces, nozzles *et cetera*). They are bought with screw threads, are very easy to fit together and are stocked by any large hardware store.

The filler cap for the tank is a five centimetre (two inch) diameter screw cap and flange with butterfly top for undoing it by hand. These caps are used for closing inspection holes on the U-shaped drainage piping under sinks or basins. Usually the patterns stocked lack a butterfly attachment, but they can be obtained quickly when ordered.

The tank itself and the metal panel are made of Muntz metal. This is the easiest of the readily obtainable metals to shape, cut or solder and will not rust if any water gets into the tank. The size of the tank is thirty by fifteen by five centimetres (twelve by six by two inches), but if plain, one of this size would not supply a strong enough mixture for all purposes, so the distance that the air has to traverse over the ether is increased by dropping four vertical vanes from the roof of the tank to within six millimetres (a quarter of an inch) of the floor. They do not, however, completely cross the tank, but alternately reach to within 1.25 centimetres (half an inch) of the front and back of it. The air, therefore, zig-zags over the surface of the ether. Two of the vanes only are shown in Figure I.

The blow-off is a urine specific gravity jar, a larger apparatus being quite unnecessary. It contains mercury and slides freely in two Muntz metal bands which hold it. A flat brass spring presses on the glass between these bands and this prevents the cylinder from slipping. The glass tube down the centre of the blow-off is steadied by two corks through which it passes. The escape of air is facilitated by cutting four vertical grooves in the sides of the corks. It will be seen that in use the glass tube in the centre remains stationary, whilst it is the cylinder containing the mercury that is raised or lowered to alter the blow-off pressure.

Turning now to the front of the apparatus (Figure II) it will be seen that an extension wire is soldered to the control handle of the "Ajax" extra air. This makes the exact position of the handle easy to see at a distance.

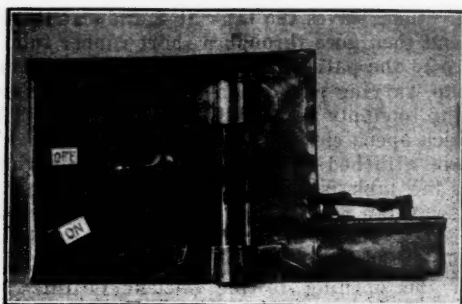


FIGURE II.
Showing Front of the Apparatus.

The function of a tambour in intratracheal anaesthesia has been indicated previously.⁽¹⁾ In this apparatus the place of the tambour is taken by a small, strong toy balloon. Those sold usually for sixpence have the requisite strength, that is, sufficient to allow inflation to the degree of turgescence only and not to the degree of much distension by the pressures used in intratracheal anaesthesia. It is seen in Figure II above the extra air control.

The manometer is safely protected from injury above and below by arches of Müntz metal, whilst it is held on to the panel by light clips of the same metal bolted on.

To economize in room, it is preferable to place the drainage tap at the side of the tank, as shown in Figure I and not at the back in Figure III. The size of the base of the apparatus is 37.5 by 15.0 centimetres (fifteen by six inches).

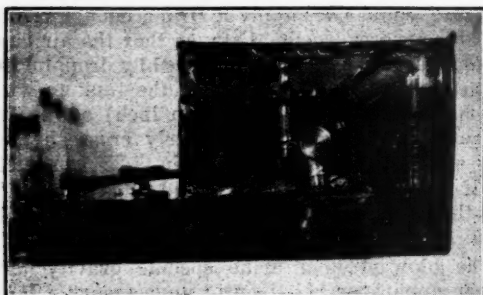


FIGURE III.
Showing Back of the Apparatus.

The control of the set is easy. The air current is started and the rubber tube to the patient is pinched. The manometer is then observed to see at what pressure the blow-off functions and the latter instrument is adjusted until the pressure registered is twenty-five to thirty millimetres of mercury, though for intrathoracic operations it may be necessary to increase the pressure for short periods.⁽²⁾ The ether vapour is now allowed to flow to the patient, the only control being the tap of the extra air which regulates the depth of anaesthesia.

The tambour or balloon is an extra safety mechanism. It will vary slightly in size with

inspiration and expiration, but should it become flaccid even for a fraction of a second during inspiration, this is an indication that there is a corresponding momentary negative pressure in the trachea and that a larger volume of air must be supplied by the pumps or bellows if one is to avoid the risks of inspiration of fluids. A long continued negative pressure would be shown by the manometer, but the inertia of the mercury is too great to show negative pressures of very short duration.



FIGURE IV.
Showing Close Up View of Air Channels.

A three-vane centrifugal air pump can be purchased from a surgical instrument firm and a suitable one-quarter horse power electric motor obtained for less than twelve pounds together. These are bolted to a board and connected with a belt. If extreme portability is required, a smaller motor will do the work, but the size advised will make electrical breakdown less likely.

References.

- ⁽¹⁾ A. B. K. Watkins: "Principle of Intratracheal Anaesthesia," THE MEDICAL JOURNAL OF AUSTRALIA, July 10, 1926, page 48.
- ⁽²⁾ Mark Lidwill: "Administration of Ether in Operations of the Lung," THE MEDICAL JOURNAL OF AUSTRALIA, December 19, 1925, page 699.

A NORMOGRAM SHOWING THE RELATION OF GASTRIC ACTIVITY AND ACIDITY TO THE BLOOD AND TO CERTAIN PHYSICAL CHARACTERISTICS: AN AID TO DIAGNOSIS AND TREATMENT.

By FRANK L. APPERLY, M.A., M.D. (Oxon.), D.Sc. (Melb.),

AND

KATHLEEN M. SEMMENS, B.Sc. (Melb.).

(From the William Macleod Laboratory, Department of Pathology, University of Melbourne.)

SOME experiments made by us during the last three years and published in this journal⁽¹⁾ show

that in healthy individuals gastric muscle activity and tonus and acid and total chloride concentration in the gastric contents at any given time vary (a) directly with the bicarbonate concentration of the blood plasma, the ratio of total lung capacity to body weight and basal metabolic rate and (b) inversely as the red cell volume of the blood.

Our theory connecting these facts is best explained by considering those instances at one end of the range of normality, for example, those in which the values enumerated under (a) above are low. Now a low plasma bicarbonate and a raised red cell count indicate some relative shortage of oxygen supply with increased pulmonary ventilation. This means a somewhat lowered level of metabolism, since complete compensation is never wholly established. This lowered metabolism in turn leads to a diminution of activity and tonus in plain muscle, such as gastric muscle and these again lead to a slower emptying of the stomach, so that at, say, one hour after the administration of a standard test meal a larger volume than usual would remain unevacuated in the stomach. This larger volume, mixed with a normal output of gastric juice, leads to a diminished concentration of acid and total chlorides in the stomach. The relative shortage of oxygen producing these changes is correlated with and would appear to be attributable to the small amount of pulmonary surface per unit of body weight. Conversely a person with a relatively large lung surface per unit of body weight has an increased gastric activity, tonus and acidity. We therefore look upon pulmonary respira-

tory area per unit of body weight as responsible for gastric "habit" or type.

In our work we investigated as a rule changes in pairs of the above variables and only sometimes did we examine more than two variables simultaneously. We now present a normogram combining all our graphs.

This figure is best explained by examples. Suppose a test meal examination with our standard four hundred cubic centimetre gruel meal in two healthy subjects A and B gave total acidity values of, say, 50° (0.050 N) and 36° (0.036 N) respectively after one hour (that is, that fifty cubic centimetres and thirty-six cubic centimetres respectively of tenth normal sodium hydroxide solution were required to neutralize one hundred cubic centimetres of gastric contents, using di-methyl-amido-azo-benzol

TABLE I.

Observation.	Subject A.	Subject B.
Total acidity	50	36
Total chloride	88	65
Gastric tonus	Orthotonic	Hypotonic
Plasma carbon dioxide . .	65	56
Red cell volume of blood	41%	45%
Vital capacity		
Ratio	67	58
Weight		

as indicator). The accompanying table shows the blood and other values (taken from the normogram) that we might expect to find in subjects A and B.

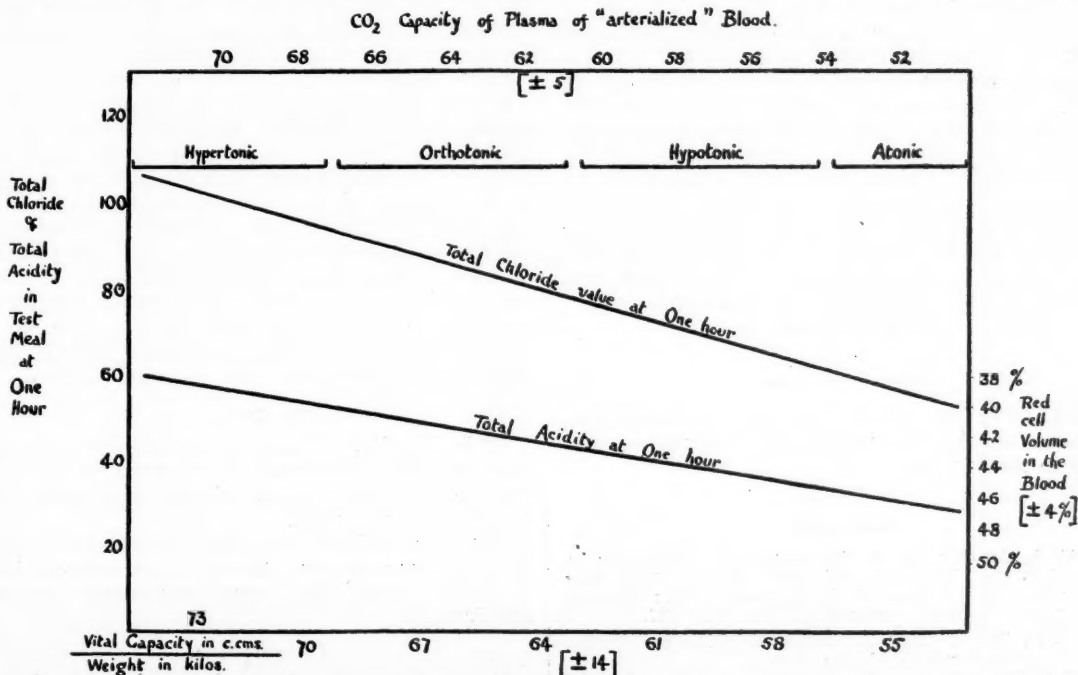


FIGURE I.
A Normogram Showing the Relationship between Gastric Tonus and Acidity, the Carbon Dioxide Capacity of the Plasma, the Red Cell Volume of the Blood and the Ratio of Pulmonary Vital Capacity to Body Weight in Normal People.

These values are, of course, only approximate. This is indicated by the figures in brackets preceded by the \pm sign and even these figures are only roughly true, being the limits of variation in our series of ninety male students.

We believe the value of these results to be as follows:

1. Gastric diathesis. Hurst,⁽²⁾ Ryle⁽³⁾ and others have brought forward "evidence that the physiological character or habit of the stomach may determine its dyspeptic reactions to various stimuli and there is little doubt that the physiological characters may help to determine the perpetuation of such a lesion as duodenal ulcer. There is, however, no evidence that the physiological characters render the stomach or duodenum more liable to acquire a lesion in the first instance" (Ryle⁽³⁾). Our work shows some of the conditions on which the physiological characters of the stomach depend, and further suggests how the latter might be altered for therapeutic purposes. A simple example is the improvement that occurs in the non-obstructive types of hypotonic dyspepsia following improvement of the blood condition by the administration of iron.

2. Clinically it is found that the gastric activity, as shown by X ray examination or the concentration of hydrochloric acid in the stomach at one hour after the administration of a standard test meal, is often greater or less than this normogram would

indicate as normal for the ratio
$$\frac{\text{Vital capacity}}{\text{Body weight}}$$
 of

the patient under examination. Thus a diminution of activity or acidity would indicate that some injurious influence other than diminished oxygen supply is affecting gastric function. We find that toxic conditions produce such a change. On the other hand a hyperirritability of the local gastric or general nervous system produces a gastric activity and acidity greater than we would expect from the normogram. We have therefore found this normogram of very definite value in the elucidation of the causes of certain obscure dyspepsias and particularly when the diagnosis was between toxic and nervous causes. We propose to discuss this matter more fully on another occasion.

Acknowledgement.

Our thanks are due to Professor P. MacCallum, the head of this department, for his interest and help in many ways.

References.

⁽¹⁾ F. L. Apperly and K. M. Semmens: "Variations in Normal Gastric Functions and Their Causes: Some New Experimental and Clinical Observations," *THE MEDICAL JOURNAL OF AUSTRALIA*, August 25, 1928, page 237.

⁽²⁾ A. F. Hurst: "Hypersthenic Gastric Diathesis," *The Lancet*, December 30, 1922, page 1369.

⁽³⁾ J. A. Ryle: "Gastric Function in Health and Disease," 1926.

NOTES ON THE TREATMENT OF SCARLET FEVER BY ANTITOXIC SERUM.

By VICTOR S. STONE, M.B., B.S. (Melbourne),
Medical Superintendent, Ballarat Hospital.

SUCH gratifying results have followed the use of scarlet fever antitoxic serum in the treatment of scarlet fever that I thought the following information obtained from the records of a number of cases would be interesting and illuminating.

One hundred and one patients were studied, this being the total number of patients treated in the Ballarat General Hospital during the past three years. The infections have been divided into three types: (i) Very severe with pronounced toxæmia, (ii) moderately severe, (iii) mild.

This subdivision, though artificial, was useful, as we did not give antitoxic serum to any patients with mild infections, owing to scarcity of serum and cost. The temperature was taken as the main guide of the patient's progress. Generally it is a useful indication and the time that elapsed before the temperature became normal, was counted in all cases and the average for each group calculated.

The results were as follows:

In patients with severe infections, Type I, treated without antitoxin, the temperature came down on an average in fourteen days. In patients with moderately severe infections of Type II treated without antitoxin the temperature came down on an average in nine days. In patients with mild infections of Type III treated without antitoxin the temperature came down on an average in seven days.

Compare this with the results after giving antitoxin. Patients with severe infections were given 300,000 units and those with moderately severe infections either 300,000 units or 150,000 units. The results were as follows. In patients with severe infections of Type I treated with 300,000 units of antitoxin the temperature came down on an average in three days. In patients with moderately severe infections of Type II, when 300,000 units of antitoxin were given the temperature came down on an average in three days. With 150,000 units of antitoxin the temperature came down on an average in five days. Patients with mild infections, as previously noted, were not given antitoxin. These figures show what a great effect the antitoxin has had.

The Serum.

Parke, Davis and Company's scarlet fever streptococcus serum was used in all cases except two and in this the serum of the Commonwealth Laboratories was used.

The doses, 150,000 units and 300,000 units, were given intramuscularly. About 15% of patients had a serum rash, but none manifested serious anaphylaxis.

Complications.

It was extraordinary how few patients developed the usual complications of the disease. In the whole

series of patients treated by serum, only one patient developed a complication of any severity. This patient was in hospital three days before we could procure the serum. The patient developed an arthritis which quickly responded to a second dose of serum.

An interesting point noticed was that the usual peeling was much less pronounced and sometimes commenced very early. Another frequent observation was the relief from general discomfort in a short time after the administration of serum. Relief occurred sometimes as soon as half an hour afterwards and long before the temperature came down.

Conclusions.

1. Scarlet fever antitoxic serum is of great value in shortening the length of the disease and in diminishing complications and should be given in all cases of scarlet fever.

2. If serum is given on day of appearance of rash and in sufficient dosage, the temperature will probably come to normal in two days or less.

3. Probably 150,000 units are too small a dose, 300,000 units are best for all well-defined infections and should be repeated if the temperature is not normal in a short period.

4. The mortality from scarlet fever will be practically wiped out by the routine early use of serum in severe infections. Forty-seven patients were treated in the last twelve months at Ballarat Hospital without a death.

5. The statement that this serum will be of as much value in scarlet fever as diphtheria antitoxin is in diphtheria will be justified, in my opinion, when we know more of the standardization of the serum and the effective dosage.

Reports of Cases.

INFECTION IN TENDON.

By JOHN HOETS, M.B., Ch.M. (Sydney), F.C.S.A.,
Honorary Assistant Orthopaedic Surgeon, Lewisham
Hospital; Honorary Assistant Medical Officer
for Orthopaedics and Therapeutics,
Sydney Hospital.

ON January 4, 1929, W.H., a mechanic, aged twenty-eight years, was seen by me. He had received a slight crush injury to the terminal phalanx of the middle finger, right hand, on July 4, 1928 (that is, six months previously). The skin was broken, but he did not cease work and had lost no time on account of the injury up to the date of consultation. He stated, however, that he had not since been able to use the finger satisfactorily and that pain had gradually become felt more in the palm until he felt he could work no longer.

On examination there was a small scar on the palmar aspect of the terminal phalanx. There were definite swelling and tenderness in the palm along the course of tendons to the affected finger. The terminal phalanx could not be actively flexed, though passive movement was free. The middle phalanx was capable of active flexion, but the movement produced pain in the palm.

On February 19, 1929, under ether anaesthesia search revealed no *profundus* tendon in the finger. The palm was opened by flaps and the tendons exposed. The *flexor*

sublimis appeared healthy in marked contrast to the *profundus* which was thickened and dull yellowish in colour. The distal end was free and on gentle traction it came away at the level of the annular ligament proximally where it had almost sloughed through. The tendon was immediately placed in a sterile test tube for examination.

No attempt was made to replace the *profundus*, there being no suitable tendon available (*palmaris longus* absent). In order to give some stability to the terminal phalanx a piece of fascia was sutured to the insertion of the *sublimis* in the mid-phalanx and to the base of the terminal phalanx. Wounds were closed and healed by first intention. Active movements were begun at the end of the first week.

The hand has perfectly good function and has given no trouble since return to work at the end of five weeks.

Pathological Report on the Tendon.

Dr. A. H. Tebbutt reported that a pure culture of *Staphylococcus aureus* was obtained from the tendon.

Comment.

It is remarkable that the tendon should become infected and give trouble only six months after the injury. There was no likelihood of infection occurring otherwise than through the accident on July 4, 1928.

CASE OF HYSTERIA.

By F. W. SMITH, M.B., B.Sc. (Sydney),
Medical Superintendent, Royal South Sydney Hospital,
Sydney.

Clinical History.

J.O., A MALE, aged thirty-two years, was admitted to hospital on May 14, 1929, from the out-patient department. He gave a history of falling off a motor cycle on the morning of that date and complained of pain in the back and inability to walk. The patient averred that he was carried into the out-patient department, but this was denied by the attendant in casualty who saw him walk in.

On the first day there was total paralysis of the lower limbs and total anaesthesia of the lower part of the trunk and limbs from the level of the eighth thoracic segment down. His abdominal reflex was absent and knee jerks were active. Upon stimulation of the soles of the feet there was an indefinite plantar response. The patient had an excited and tremulous facies and the left corneal reflex was absent. He complained of pains in the back and of a full bladder and that his water was dribbling away from him, which was so. A catheter was then passed, but stopped at the sphincter and was withdrawn. Immediately the patient passed urine in the normal way, but was seen to be pressing with his hand on the lower part of his abdomen. About a litre of urine was passed and the colour resembled that of clear tap water. His spine was then examined by X rays and the skiagram showed a small triangular translucency in the central and posterior part of the body of the seventh thoracic vertebra. Thereupon a diagnosis of fractured spine was made. His temperature and pulse rate at 4 p.m. and 8 p.m. were 36.4° C. (97.6° F.), 100 and 38.1° C. (100.6° F.), 100 respectively. He was given an injection of morphine sulphate and slept most of the night.

On the second day the patient still complained of pain in the spine and continued to ask for relief. There was still loss of movement of the lower limbs and he maintained a conversation whilst a pin was jabbed into his skin at all areas from a level of the eighth thoracic segment down without a flinch. His left cornea was more sensitive and knee jerks present, perhaps a little exaggerated. The abdominal reflex was doubtful, as also the reflex of the great toe. He passed urine naturally, though with some difficulty.

The report of the honorary radiographer on the skiagram taken the previous day was that the abnormality of the

seventh thoracic spine was a congenital defect. The temperature was 37.6° C. (99.7° F.) and the pulse rate 90.

At 2 a.m. on the morning of the third day since admission he was found asleep by the night sister, curled up, lying on his side with thighs and knees flexed. An effort was thereupon made to differentiate a state of malingering from a functional condition. His pubic hairs were pulled upon and pins were stuck in him at every level below the eighth thoracic segment without the slightest response. Upon coaxing him, he was able to abduct both legs slightly. The temperature was 36.7° C. (98° F.) and the pulse rate 86. No sedative was given on this night and he again slept on his side with both legs drawn up.

On the fourth day he was suspicious that he was being looked upon as a malingerer and demanded to leave the hospital. All his sensations were normal, if not hyper-sensitive and he had full movement of his lower extremities. He asked that he be permitted to sign a paper that he was leaving at his own risk and, resenting his treatment, walked away from hospital in spite of strenuous efforts to keep him for further observation. It was hoped to eliminate a possible hæmatomyelia of the cord with a lumbar puncture, but the patient's dramatic recovery seemed to exclude this and a diagnosis of hysteria was made.

It was reported that he had been in Australia six weeks, was out of work, had suffered from shell shock at the war, but it was found that any history given by him could not be relied upon.

BACILLUS WELCHII SEPTICÆMIA.

By RUPERT A. WILLIS, M.D. (Melbourne),

Medical Superintendent, Austin Hospital for Chronic Diseases, Heidelberg, Victoria.

A MALE, aged forty-five years, was admitted to the Austin Hospital on May 20, 1929. Six months before, he had undergone nephrectomy for a malignant tumour of the left kidney; but soon afterwards masses recurred in the loin. On admission he had a bulky, irregular mass occupying the left loin and lateral part of the abdomen. Posteriorly the tumour was lobulated, adherent to the distended skin and dark purple in colour.

Three days after admission the mass ulcerated and severe hæmorrhage occurred. This continued intermittently during the ensuing week and a fungating neoplastic mass developed through the ulcerated area.

The patient died on June 5, 1929, at 2.15 p.m.

At 7 o'clock the following morning, that is seventeen hours after death, the mortuary attendant reported that during the night the corpse, formerly spare and emaciated, had become greatly swollen and discoloured and that large quantities of sanious fluid were exuding from all parts of the body.

An autopsy was performed at 10 a.m. The whole body was enormously distended and much discoloured and large blebs of blood stained serum had developed on all parts of the skin. Emphysematous crepitus and a tympanic percussion note were everywhere present from the scalp to the feet. The serous cavities contained much gas under considerable pressure and some blood stained fluid. All viscera were congested and discoloured and their structure obscured. The liver was a dark slate colour. The spleen was almost fluid in consistence. The blood in the heart and all vessels was dark and frothy. No large gas cysts were found in any of the viscera, the gas being distributed in fine bubbles as an interstitial emphysema.

The left lumbar growth was soft and semifluid. It had infiltrated the posterior wall of the descending colon. There was no evidence of any metastases in other parts.

Smears of the splenic pulp and of the blood stained exudate from various parts of the body were stained by Gram's method and all contained enormous numbers of stout Gram-positive bacilli with rounded ends, a pale-staining middle segment and a definite capsule. No spores were present and no other organisms could be found.

There can be little doubt that the condition was one of terminal *ante mortem* *Bacillus welchii* septicæmia, originating where the tumour had involved the colon and that there was generalized *post mortem* multiplication of the organisms with their characteristic saccharolytic and gas-producing effects. It is inconceivable that the organisms could multiply so rapidly as to spread in the tissues from the loin to the scalp in less than twenty-four hours. There must have been septicæmic spread prior to death, probably only in the last few hours or even minutes of life.

THE INJECTION TREATMENT OF VARICOSE VEINS: DELAYED PERIPHLEBITIS.

By RONALD DAVIDSON, M.B. (Melbourne),
F.R.C.S. (Edinburgh),
Melbourne.

J.P., a male, aged sixty-seven years, was first seen on October 5, 1928. He complained of a painful ulcer on the outer side of the right foot which had been present for three months. He gave a past history of operations for the removal of the varicose veins, the first sixteen years ago for veins in both legs; the second fifteen months ago for some isolated varices in the right leg.

Examination revealed a small ulcer on the outer side of the right foot just anterior to the lateral malleolus. Despite previous operations there were varicose veins present, two especially, a portion of the external saphenous vein and a vein coming over the front of the tibia, were apparently involved in the production of the ulcer. The circulation of the legs was not good, the legs and feet being rather blue and cold. There was no evidence of any thrombosis in the deep veins and no history suggesting edema was obtained. General examination failed to disclose any disease of cardio-vascular or renal systems.

The Wassermann test yielded no reaction with all methods except the Kolmer method; with this it yielded a partial reaction. This was regarded by the pathologist (Dr. A. Brennan) as no reaction in the absence of any definite history. It was decided to inject the veins involved in the ulcer. Two injections of 0.5 cubic centimetre each of the ordinary solution of quinine and urethane were given, one into each of the two veins before mentioned, about five centimetres (two inches) above the ulcer. The patient was next seen on October 22, 1928. About fifteen centimetres (six inches) of the anterior vein were thrombosed and about 2.5 centimetres (one inch) of the external saphenous. Another small injection was made into the external saphenous vein and an Unna's paste bandage was applied with a sponge next to the ulcer. Owing to the patient complaining of pain felt at the site of the ulcer, this was removed in a few days. As the patient was unable to tolerate any Unna's paste bandages, he was advised to lie up in bed, which he did. On November 24, 1928, the ulcer was almost healed, but three red tender areas were noted along the course of the thrombosed vein lying over the tibia. These spots were about as big as sixpences and were extremely tender. Any movements caused pain felt along the course of the vein. Spirit dressings were applied and the patient was kept as quiet as possible with the affected limb under a cradle. During the next few days further red areas developed and some of the original ones subsided. On January 3, 1929, there was a discharge of necrotic material and serum from one of the red areas. There was no pus or other evidence of infection. The shallow ulcer soon healed, as also did two other small ulcers which formed in the same way. The other red areas subsided and disappeared. The patient was walking without pain on January 31, 1929, and the ulcers had healed.

The features worthy of note in this case were:

1. A periphlebitis going on to ulceration occurring some distance from the site of injection.
2. The fact that this periphlebitis was delayed. The vein was thrombosed for about three weeks before this complication occurred.

Reviews.

LECTURES ON THE CENTRAL NERVOUS SYSTEM.

THREE important lectures on neurobiotaxis and other subjects delivered by Professor Ariëns Kappers at the University of Copenhagen have been published in book form.¹

In the first lecture Dr. Kappers further illustrates the phenomena of neurobiotaxis by a series of apposite examples taken for the most part from the vertebrate nervous system. For instance the question as to why the forebrain and not the midbrain develops into a predominant portion of the brain in mammals especially is discussed.

Again, a causal relationship based on neurobiotaxis is shown to exist between the partial fusion of the visual fields in stereoscopic vision and the partial instead of complete decussation of the optic nerves which we find in primates *et cetera*. The phenomena of neurobiotaxis which were first especially observed in the motor nuclei of the vertebrate brain stem, afford a ready explanation of the varying positions of the facial motor nucleus which in the shark, for instance, lies in close relationship to gustatory centres, the seventh nerve in these animals controlling the gill musculature of the second arch and therefore the passage of sea water past the gustatory organs.

In a mammal such as a rodent the nucleus has migrated to come into relationship with the fifth cranial nerve nucleus and with optic reflexes *et cetera*; only the sympathetic nuclei of the facial nerve preserve a dorsal position close to the old gustatory or taste centre.

He concludes his lecture with the statement that "when these details have been forgotten two cardinal points may be remembered": (i) That the mental law of association may also be observed in the phenomena of neurobiotaxis, (ii) that the teleological character of the intrinsic structure of the brain coincides with neurobiotactic causality.

In the second lecture Kappers discusses the phylogenetic and ontogenetic development of the *corpus striatum* and indicates the experimental and morphological evidence that the *sulcus limitans* separating a dorsal alar or sensory plate of the nerve tube from a ventral basal plate ends immediately behind the preoptic recess. Supporting this view, he points out that sympathetic functions are associated with cell groups situated along the *sulcus limitans*, not only in the floor of the fourth ventricle, but anteriorly in the *tuber cinereum* region, in other words the place where the *sulcus limitans* ends anteriorly is like the rest of this sulcus, a place of predilection for central autonomic nuclei.

The author then describes the development of the *palaeostriatum*, the *archistriatum* and *neostriatum*, the first two being more especially related to olfaction and the other senses correlated with oral sensation. In the mammal the *neostriatum* is represented by the *putamen* and caudate nucleus and the *palaeostriatum* by the *globus pallidus*. Finally the relations of the *corpus striatum*, more especially the *neostriatum* to the cerebral cortex are discussed.

In the third lecture the author discusses the development of the cerebral cortex and the functions of its layers. He distinguishes a *palaeocortex* which is a primary olfactory cortex, and the secondary olfactory cortex or hippocampal cortex or *archipallium* and then developing between the two a *neopallium*. Commencing with studies upon layers of cells in the *palaeocortex* and *archicortex* he comes to the conclusion that the outer granular layers are receptive and correlative and the deep pyramids are cortico-fugal and commissural efferent in function. This general arrangement finds its simplest form in the *palaeocortex*

where we simply have two layers of cells, the superficial receptive and a deeper efferent layer.

The superficial layer is associated neurobiotactically with the superficial position of the afferent cortical fibre systems. In the *neocortex* in addition to these two fundamental groupings of the layers, a third layer develops more superficially forming the supragranular cells associated with an increase of cortico-petal and association fibres.

These lectures cannot fail to be of interest to anatomists and neurologists.

PROGRESS IN THERAPEUTICS.

"GENERAL THERAPEUTICS," by Fantus,¹ one of the volumes from "The Practical Medicine Series," is a collection of abstracts on the subject from the current medical literature of the past year. Many of the lines of treatment suggested for use in some conditions are startling in their originality and for the most part seem to lack a scientific basis and the merit of adequate trial. The administration of 10% dextrose by the intramuscular route in conditions accompanied by nausea and vomiting and in pneumonia and typhoid fever is alluring and appears to be sometimes of value. In children this method should be particularly helpful, as the difficulty of intravenous medication in the young is well known.

The article on digitalis with its warning against the indiscriminate use of this drug is timely and worthy of attention. The work is marred by many errors in spelling quite apart from the phonetic form in general use in America and as a reference book relating to modern methods of treatment is not to be compared with the "Medical Annual."

It is a volume of handy size, neatly bound in green and published by the Year Book Publishers of Chicago.

ADVANCES IN MEDICINE.

THE volume dealing with general medicine in the Practical Medicine Series of 1928 is on the whole up to former standards.² There is a tendency, however, to dilate at undue length upon some subjects with detailed history of cases. Though these are quite in order in reports of monthly meetings of medical societies, they occupy too much space in a book dealing with such a huge subject as general medicine.

The opening chapters are devoted to infectious diseases. The advance made in the early diagnosis of poliomyelitis and its treatment by human serum before the development of paralysis are emphasized. Though the number of patients treated in this way and by Rosenow's serum by each contributor is necessarily small, the sum of the groups shows a distinct advance in knowledge and successful treatment.

Though Australia has been fortunate enough to have escaped by its geographical position an epidemic of small pox, there may come a time of regret for our slackness with regard to vaccination and emphasis is laid on some valuable points in the diagnosis of variola, particularly as distinguished from varicella. It is pointed out that in the former there is always at least a forty-eight hours' interval between the onset of symptoms and the development of the rash, while in the latter the interval seldom exceeds twenty-four hours. In addition the area of distribution of the rash is typical, that of variola being centripetal on the extremities *et cetera*, that of varicella centrifugal over the body, upper part of the arms and thighs. Again small

¹ "Three Lectures on Neurobiotaxis and other Subjects, Delivered at the University of Copenhagen," by C. U. Ariëns Kappers; 1928. London: William Heinemann (Medical Books), Limited. Royal 8vo., pp. 76, with illustrations. Price: 7s. 6d. net.

¹ "The Practical Medicine Series, Comprising Eight Volumes on the Year's Progress in Medicine and Surgery: General Therapeutics," by Bernard Fantus, M.S., M.D.; Series 1928. Chicago: The Year Book Publishers. Crown 8vo., pp. 470, with illustrations. Price: \$2.25 net.

² "The Practical Medicine Series Comprising Eight Volumes on the Year's Progress in Medicine and Surgery: General Medicine"; 1928. Chicago: The Year Book Publishers. Crown 8vo., pp. 832 with illustrations. Price: \$3.00 net.

pox eruption is most apparent when the arms are folded on the opposite shoulders, that of varicella when the arms are held apart. An interesting point which may be purely a coincidence, is mentioned, namely, the incidence of varicella and *herpes zoster* in a family at the same time. Other cases of similar type have been mentioned, but they are exceedingly rare. An undue amount of space seems to be allotted to the subject of tularemia caused by the bites of rabbits. It would appear that American rabbits are much fiercer than those in Australia; so far this disease has not been reported in the Commonwealth.

The author quotes a number of writers who are anxious to introduce surgical treatment of pulmonary tuberculosis at an earlier stage than has been customary in the past.

In the treatment of lobar pneumonia stress is laid upon the early and repeated use of polyvalent serum, without waiting for the actual typing to be carried out. Unless serum is administered in the early stages, enormous doses must be given. "Lipiodol" is recommended in empyema and would appear to lessen the time of healing.

In pernicious anemia the use of liver as such or as an extract has been the subject of numerous articles all pointing to the efficiency of this form of treatment. The method of its action is apparently the flooding of the blood with reticulocytes. It would appear to K. Stejskal that the time is almost ripe for the abolition of the meal as taken at present by the mouth and a substitution of percutaneous administration of food. The food itself is composed of 50% fat, 36% carbohydrate, 4.8% protein. A daily inunction of two hundred grammes should contain 1350 calories. It is doubtful, however, whether this form of feeding will receive universal approval.

A RADIOLOGICAL ATLAS OF THE VERTEBRÆ.

"THE VERTEBRÆ," by Ariel W. George and Ralph D. Leonard, constitutes Volume VIII of the *Annals of Roentgenology*, a series of monographic atlases edited by James T. Case.¹

This excellent book is a valuable addition to the very scanty literature on the Röntgenology of the spine and will be welcomed by all who have to deal with industrial injuries in connexion with the *Workers' Compensation Act*.

The first part of the book is devoted to general considerations of the spine as a whole, normal changes due to age and posture, structural abnormalities including congenital anomalies and injuries and pathological conditions.

The authors very properly condemn the widespread use of the term osteoarthritis to cover all those hypertrophic changes which occur in the spine characterized by osteophytes and spur formation and which in many cases are the result of age and occupation. The term osteoarthritis implies a pathological condition and its thoughtless use may lead to serious results especially in compensation cases.

The authors also state definitely that trauma is never a factor in the causation of tuberculosis, although of course it may aggravate an existing lesion, an important consideration in industrial injuries.

The second part of the book deals with the sectional study of the vertebral column. Congenital and acquired variations, injuries and disease of the vertebræ in the cervical, dorsal and lumbar regions are discussed in detail and a special chapter is devoted to the fifth lumbar vertebra owing to the many variations occurring in this region.

Fractures and dislocations of the skull, atlas and second cervical vertebra are fully treated and a useful method is described for determining whether these parts are in proper relation to each other by comparing the relative positions of lines joining certain anatomical points.

Spondylolisthesis is discussed at length and the authors conclude that congenital defects of the fifth lumbar

vertebra are most frequently the cause of its forward displacement and that the condition can exist especially in children without any history of trauma. They admit, however, that trauma may be a direct cause of the displacement with or without congenital anomalies and suggest that when the condition is found after an alleged injury in industrial cases, all the aetiological factors should be thoroughly investigated before the opinion is given that the condition has resulted from the injury.

A section on industrial back injuries is contributed by John D. Adams.

An appendix is added dealing with certain phases of medico-legal expert testimony; much useful information and advice are given for those who are called upon to give medical evidence.

The book is printed in large type on art paper throughout and the reproductions are really excellent.

HINTS FOR JUNIOR PRACTITIONERS.

SEVERAL useful books have already been published with a similar aim to that of "Gleanings from General Practice," by Dr. David Tindal.² The author ventures to believe and with justification that there is something distinctive in the unpretentious paragraphs and offers them with the interested regard of an old practitioner for the younger members of the profession.

This small but useful work contains practical hints for the young practitioner on professional conduct, medical treatment, the care and treatment of children and the aged and notes on cookery and sick room administration with a few useful remarks and remedies. There are also a collection of formulæ of useful prescriptions and two indices. When a doctor has been engaged in general practice for many years he has developed a certain professional sense which cannot be expected in a beginner and he has become familiar with many complaints, useful remedies and lines of treatment which are not described in text books or known to consultants who have "specialized" from the outset of their careers.

After a perusal of this little work we recommend it as a valuable addition to the libraries of junior practitioners.

ADVICE FOR MOTHERS.

"A HANDBOOK FOR MOTHERS," by C. Phyllis Armitage, is a well written book containing much useful information.³ No mother could read this book without feeling encouraged and helped.

It is pointed out that sensation appeals and neighbours and friends are more interested in the abnormal than the normal. Excellent advice is given to the mother in regard to herself and the management of her child in health and sickness.

Pregnancy and breast feeding are fully dealt with and the information is good, except that feeding the baby for "ten minutes each side" may result in the baby not stripping either breast. Under "Artificial Feeding" the statement of quantity of emulsion necessary in modified milk is too vague.

Weaning and feeding up to one year are well described, but a child a year old could not masticate "meat, cut into cubes." Pastry, forbidden "until eighteen months," would be better not allowed at all.

Childish ailments and infectious diseases are explained. Under "Prolapse of the Rectum" the removal of the strapping for the bowel action as indicated is unnecessary. It is not advisable for mothers to use hydrogen peroxide as described in the treatment for discharging ears.

A useful appendix finishes a good book.

¹"Gleanings from General Practice," by David Tindal, M.D., F.R.C.P.S. (Glasgow); 1929. London: Baillière, Tindall and Cox. Crown 8vo., pp. 219. Price: 6s. net.

²"A Handbook for Mothers: Practical Advice on Pregnancy and Motherhood," by C. Phyllis Armitage, with a Foreword by Gerald Quin Lennane, M.C.; 1929. London: John Bale, Sons and Danielsson, Limited. Crown 8vo., pp. 134. Price: 2s. net.

³"Annals of Roentgenology: A Series of Monographic Atlases," Edited by James T. Case, M.D.; Volume VIII; The Vertebræ; 1929. New York: Paul B. Hoeber, Incorporated. Demy 4to., pp. 282. Price: \$10.00 net.

The Medical Journal of Australia

SATURDAY, AUGUST 10, 1929.

The Fifteenth Anniversary.

ON August 4, 1914, the medical profession like the other sections of the British community, was, save for a few notable exceptions, quite unprepared to meet a national emergency. That the ultimate result of hostilities was victory is immaterial; Great Britain has often met a danger without adequate preparations and has relied on the bull-dog characters of the nation to force its way through to a successful issue. The nation has every reason to look back with pride on the deeds of individuals, on the heroism of the men who faced danger and death for the Empire. It must, however, be recognized that it is bad policy to wait until the emergency arises before an organization is created. The Royal Army Medical Corps and the Australian Army Medical Corps were neither large enough nor elastic enough for a world war and the emergency of 1914 rendered it necessary for the authorities to call into being a new organization, planned on special lines to suit the immediate needs of the many theatres of war. In the course of over four years a vast amount of experience of the utmost value was gained in connexion with the medical aspect of modern warfare. As each year passes, there is danger that this experience may be lost to Australia, since the Australian Army Medical Corps has since been reduced to a mere wraith of its former strength and completeness. Should large armies again enter the field in the near future, we would be just as unprepared as we were fifteen years ago, unless something be done to render the lessons of the Great War permanent.

It is not the function of a medical journal to discuss international problems. The main work of the League of Nations, while it has a strong appeal

to the individual members of the medical profession both on account of the soundness of the principles on which the League is attacking its enormously difficult task and on account of the extraordinary manner in which the League has handled international problems with eminently satisfactory results, is no concern of the medical profession. By main work of the League is meant the work of endeavouring to replace war by discussion and arbitration. It is true that the League of Nations does render itself responsible for much very important medical work in international fields. With this, however, we are not at present concerned. Again it lies outside the province of a medical journal to enter upon a discussion of those actions of governments resulting from the suggestion of limitation of armaments. These matters, however, are relevant to the subject of the maintenance of an adequate permanent medical service within the defence forces of Australia. It may be stated that if public opinion in all large countries were strong enough, war could be made impossible. The League of Nations is working skilfully and assiduously to this end. The League of Nations Unions in every country are endeavouring to create a determined demand on the part of the people that international disputes should no longer be settled by an appeal to arms. We are bold enough to state that the medical profession as a whole supports this movement and expresses its utter abhorrence of warfare from every point of view. On the other hand, there does not appear to be any justification for the belief that war will be banished from the history of the world, at all events in the immediate future. Nations, like human beings, are actuated in their dealings with their neighbours by selfish motives. Commercial advantages, the increase of territorial possessions, domination of power are factors which influence nations to become aggressive. It is vain to seek love or friendly feelings among the mass for people of a foreign country. Amicable relations exist as long as two nations neither suspect each other of ulterior designs on the colonies of the one or other nor seek to rob each other of established trade. Like individual human beings, nations will fight on small provocation if suspicion of this kind

exists. The suspicion is often stimulated, if not invented, by the political press. Unless the view becomes universal that war with all its horrors, wastage and inhumanity damages the victor almost as much as it hurts the vanquished, the peoples of the world will not raise their voices to render war an impossibility.

In spite of the world's idealists, it is unsafe to disregard the possibility of another great war. Idealists are relatively rare and it therefore behoves every nation to make adequate preparation for another vast sacrifice of the best young lives. It may be urged that the maintenance of a standing army of reasonable dimensions in Australia is too costly to be practical. Be this as it may, the medical service should be maintained, even if this entails a large annual outlay. Colonel Graham Butler is experiencing grave difficulties in securing the records and diaries of the medical officers who occupied positions of trust and command in the Great War. Already it is evident that the history of the medical services with the Australian Imperial Force will be incomplete because so little importance has been attached to the perpetuation of experience. The Australian Army Medical Corps has been allowed to become a mere skeleton, a miniature embracing a handful of enthusiasts who refuse to allow the experience of the organization to be finally lost. Fifteen years ago no one knew what would be needed and how the requirements of the armies as far as the medical services were concerned, would be met. That organization was built up at enormous cost. Are the same mistakes to be made, should another war break out among the powerful nations? This is not the first time that we have demanded that steps should be taken to preserve a reasonably large and adequately efficient army medical service in Australia. In a few years those who witnessed the mistakes and the defects of the early stages of the Great War, will be gone. Who will then be in a position to prevent the same failures from occurring? It is impossible to overlook the unrest that is creeping round the world. Hatred still exists in our midst and there is much inflammable material that needs but a spark to start another world holocaust.

Current Comment.

TUBERCULOSIS OF THE THYROID.

GOITRE is by far the commonest disease of the thyroid gland. In some books dealing with diseases of this organ other conditions receive but scant mention. It is important to remember that the thyroid is subject to other changes and that these may occur either alone or in company with a goitrous manifestation. Inflammatory changes, malignant disease and syphilis are probably the most common non-goitrous conditions, but tuberculosis must not be forgotten. Tuberculosis of the thyroid occurs most usually in miliary tuberculosis. The other manifestations of tuberculosis may occur, namely, caseation, calcification and fibrosis.

S. W. Budd and Carrington Williams have recently reported three cases of the sclerosing type of tuberculosis of the thyroid.¹ They point out that in this form the thyroid is converted in whole or in part into fibrous tissue. They also refer to the view that the sclerosing process results from circulating toxins from a remote tuberculous focus. They are at variance with the view of Collier and Huggins that the characteristic histological appearances of tuberculosis are lacking. They have found typical tubercles, though they have not found caseation, liquefaction or calcification. According to them the disease begins as an ordinary miliary tubercle with epithelioid cells, giant cells and small round cells and instead of passing into a stage of caseation, the process becomes fibrous, simulating the fibrosis seen in chronic fibrous tuberculosis of the lungs and the fibrosis seen in certain forms of lupus. A large number of giant cells was seen in their specimens, as many as ten or more being seen in a single tubercle. There was a rather limited round cell response. The fibrous tissue was quite dense, but in the vicinity of the tubercles it was sometimes cellular, the predominant cell being of the fibroblastic variety. In some zones the fibrous tissue tended to take on neoplastic characteristics. A point of some importance from the diagnostic aspect is the statement that in gross appearance the gland may give the impression of malignant disease and that the fibrosis may involve one lobe or the entire gland.

The three patients whose condition is reported by Budd and Williams, were women, aged respectively 42, 43 and 37 years. All three complained of soreness and tenderness in the region of the thyroid of a few months' duration. Slight fever and acceleration of the pulse rate were present in all three instances and two of the patients had lost weight. The patients were "nervous" and two of them manifested an increase in the basal metabolic rate. In none of the patients were signs of active tuberculosis found, but one had suffered from bronchitis for several years and another had a scar of a cervical abscess and a chronic anal fistula. All three were

¹ *The Journal of the American Medical Association*, May 25, 1929.

submitted to surgical operation and all gained weight afterwards; the general symptoms were in large measure relieved. It was thought that the first patient was suffering from a malignant condition and that the second had an acute pyogenic infection. The condition of the third was correctly diagnosed before operation in the light of the findings of the first two.

The first point to be considered in connexion with these cases is that of diagnosis. This will be difficult. A diagnosis of goitre might easily and excusably be made. The basal metabolic rate may be increased, the metabolism of the thyroid cells would certainly be upset by the presence in the gland of active tubercle bacilli. The hardness of the swelling might render its differentiation from malignant disease a matter of considerable difficulty. The result of the Wassermann test would help to exclude syphilis, but even in the presence of a reaction to the test and of signs of active or quiescent syphilis in other parts of the body, it would most likely be necessary to await the result of treatment before the thyroid swelling could be regarded as the result of infection by the *Spirochæta pallida*. The finding of healed or of active tuberculous foci in other regions is the factor most likely to lead to a correct diagnosis.

Another point which ought not to need emphasis, is the necessity of careful examination of all specimens removed at operation. This is done in most clinics as a routine. There are still some surgeons of considerable experience with an uncanny diagnostic power who rely on their macroscopical diagnosis in deciding the fate of an organ at operation. Mistakes are liable to occur with expert pathological investigation. They will happen much more often when macroscopical appearances and intuition alone are relied upon.

Finally it is interesting to consider why the thyroid should become affected with tuberculosis, while other organs remain free. It is a simple matter to picture the infection of cervical lymphatic glands or the lower portion of the respiratory tract or the mesenteric glands or even of the meninges by way of the blood stream. It is not so easy to understand why a gland placed as the thyroid is in a capsule and as it were sidetracked, should become affected by a local manifestation of what is generally a widespread disease. It may be concluded that it is not only the virulence of the tubercle bacillus which results in the thyroid lesion, but that there is some quality in the thyroid which is necessary. In our issue of March 30, 1929, we published an abstract of an article by Allen K. Krause in which he discussed the question of immunity and allergy in the pathogenesis of tuberculosis. Krause holds that when tissues of the human body are brought into contact with living tubercle bacilli, two fixed forces are brought into play, the inherited constitution and the virulence of the parasites. A third force, environment, is variable and is regarded by him as being the moulding and directing agency in all chronic and many acute tuberculous infections. He thinks that when an initial infection becomes

established, the progress of the disease is affected by two tissue attributes, immunity and allergy. He describes immunity as an increased specific resistance to tubercle bacilli and allergy as tissue hypersensitiveness to tuberculo-protein which arises with the formation of anatomical tuberculosis. Taking this hypothesis as a ground work, it is possible to regard tuberculosis of the thyroid, occurring as a manifestation of miliary tuberculosis, as part of the response of an allergic organism to a massive infecting dose. When a chronic infection occurs, the resistance of the body is such that the process of healing may go on and fibrosis result. Tuberculosis affecting the thyroid only may then be regarded as the result either of a local allergy or of an anaphylactic manifestation arising from the action of the tubercle bacillus on the gland.

THE NON-ABSORBABLE SUTURE.

For many years it has been regarded as unwise to use non-absorbable material in the performance of anastomoses between the stomach and small bowel. This conception undoubtedly arose from the discovery of the suture material in the neighbourhood if not in the base of post-operative ulcers. W. J. Merle Scott has investigated the non-absorbable suture question.¹ He has found that about 50% of post-operative ulcers occur away from the suture line. His investigations were carried out on eight dogs. He produced chronic peptic ulcers by draining the duodenum into the terminal part of the ileum. He states that the resulting ulcer is similar in pathological appearance and in natural history to those found in human beings. The jejunum was then anastomosed to the pylorus with silk. Chronic jejunal ulcers occurred in six of the dogs and in each of these animals the ulcer was not situated at the line of anastomosis. The distance of the ulcer from this line varied from 1.0 to 1.5 centimetres. Several things must be considered before Scott's conclusion can be accepted that there is no convincing evidence, clinical or experimental, against the use of non-absorbable sutures in gastrointestinal operations. In the first place some importance should be attached to the fact that the ulcer he produced could not be regarded as similar to human gastric ulcer. In the second place he accepts as controls experiments by other workers who used catgut only; he used no controls himself. In the third place after a secondary operation he found that an ulcer had formed only two millimetres away from his suture line, though the first ulcer had healed. He thinks that if the ulcer had extended further, the suture might have been blameworthy. It might still be an irritant at two millimetres' distance if some other local factor was operative. It seems reasonable to continue in the use of absorbable materials; once they are absorbed, there is no foreign body present. Such bodies must always be regarded as a menace.

¹ Archives of Surgery, April, 1929.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Dysentery Treated with Bacteriophage.

B. K. PAL CHOUDHURY AND J. MORRISON (*Indian Medical Gazette*, February, 1929) record an account of the spread of an epidemic of bacillary dysentery in a Khasi village and its treatment with bacteriophage. It was ascertained that the epidemic was due to water pollution brought about by pigs eating dysenteric stools and drinking at the pool which supplied the village with water. No new cases occurred after the pool was fenced off. Two cubic centimetres of bacteriophage in about 130 cubic centimetres of water were administered to each patient, three times on the first day and subsequently twice a day. There was recovery in all of forty-three instances of mild and nineteen of moderately severe dysentery, while of eighteen patients who suffered from the disease in a severe form, three died. Of those who died, one, an adult, had been eight days ill prior to the institution of treatment; two were infants, one of whom suffered from an extensive aphthous ulceration of the mouth and the other was so feeble that it could not be fed. Forty-three samples of stools were sent to the Pasteur Institute, Shillong, where, though the specimens had been twenty-four hours in transit, *Bacillus dysenteriae* (Shiga) was isolated three times and *Bacillus dysenteriae* (Flexner) four times. The authors consider that the treatment by bacteriophage under singularly difficult conditions gave satisfactory results.

Immunological Investigations in Tropical Sprue.

CHARLES WEISS AND FRANCISCO LADRÓN (*American Journal of Tropical Medicine*, March, 1929) record the results of their investigations into the monilicidal activity of the blood of sprue patients, into the skin reactions following injections of toxins of monilia and into the attempted experimental transmission of sprue. Conflicting results have been obtained by the few workers who have studied the immunological reactions of patients suffering from sprue. A recognition of this fact led Weiss and Ladrón to conduct their experiments. The surface of a Sabouraud plate was smeared with 0.1 cubic centimetre of a mixture of blood and a suspension of *Monilia psilosis*. Appropriate controls were employed. After a period of forty-eight hours' incubation the colonies of monilia were counted. The results did not suggest any increased capacity of the blood of sprue patients to inhibit the growth of the monilia. The blood of a rabbit immunized with *Monilia psilosis* appeared to some degree to inhibit the growth of

Monilia psilosis, *Monilia albicans* and *Monilia cryptococcus*, but no definite degree of specificity was observed. The skin reactions of sprue patients following injections of exotoxins and vaccines of monilia were studied. In a majority of sprue patients a local skin reaction was observed after injection of exotoxins or vaccine of *Monilia psilosis*, but a still higher percentage reacted to injections of *Monilia albicans* and *Monilia cryptococcus*. A number of the controls also reacted positively to all toxins and vaccines. Attempts to transmit sprue to three human subjects and to three monkeys by rubbing into the tongue scrapings from the inflamed tongue of a sprue patient were unsuccessful. Injections of *Monilia psilosis* into the skin of human volunteers and into the tongue and peritoneum of monkeys also failed to produce the disease.

CHARLES WEISS AND O. COSTA MANDRY (*Journal of Immunology*, April, 1929) review the literature on sprue and come to the conclusion that there is no satisfactory explanation for the peculiar intolerance on the part of sprue patients to cereals, starches, fats and sugars in terms of chemical or pathological concepts. An investigation was therefore made to determine whether the untoward gastro-intestinal reactions observed in sprue patients (diarrhoea, tympanitis, flatulence *et cetera*) after ingestion of certain types of food might be of the nature of specific hypersensitiveness. A careful survey was made of the foods commonly eaten by the people of Porto Rico and representative types were selected for cutaneous tests. These included proteins prepared from rice, beans, pork, cod-fish, coconut *et cetera*, sugars (saccharose and fructose), fats and oils (lard, butter *et cetera*), starches prepared from rice, potatoes, beans *et cetera* and local spices and coffee. No reactions were obtained and the results indicate that the untoward digestive symptoms of sprue patients are not due to any specific sensitization to any food products.

Post Mortem Bacteriological Examination.

EMANUEL Z. EPSTEIN AND M. A. KUGEL (*The Journal of Infectious Diseases*, April, 1929) have carried out a bacteriological investigation in an attempt to evaluate with the aid of modern methods how much stress can be laid on the presence of organisms in the blood after death when no bacteria were grown from the blood during life. In observations on sixty-six blood cultures and sixty-two bone marrow cultures at least one organism was always present. Of forty-two heart muscle culture tubes five were sterile and of forty-three made from valves four were sterile. Streptococci of all kinds were isolated in 79% of the cultures of the blood, in 67% of those from the bone marrow, in 47% of those from heart muscle and in 40% of those from normal valves. Non-hæmolytic streptococci were found in either blood, bone marrow, heart

muscle or valve in 86% of the cases. The author notes the infrequency of the occurrence of the pneumococcus, *Streptococcus β* and anaerobic organisms. A strikingly high percentage of non-hæmolytic streptococci tested was identified as enterococci. It seems that no significance can be attached to the recovery at autopsy of such organisms as *Streptococcus α*, *Streptococcus γ* enterococcus, *Staphylococcus aureus*, *Bacillus coli* and *Bacillus pyocyaneus* unless the same organism has been found during life.

Agglutination Tests with Bacillus Abortus.

CECIL I. B. VOGÉ (*Edinburgh Medical Journal*, April, 1929) in a preliminary communication records the results of agglutination tests carried out upon human blood serum with the use of *Bacillus abortus* as antigen. A full description of the method used is given. A positive result was obtained with 6% of the specimens examined. Serum subjected to heating for thirty minutes at 55° C. prior to the test failed to show any agglutination of antigen in any dilution. The author determined that the capacity of serum to agglutinate *Bacillus abortus* is independent of syphilitic infection. The literature dealing with infection of the milk supply by *Bacillus abortus* and consequent possible infection of man and demonstration of antibodies in human serum are discussed, as well as the part the organism may play in causing intermittent fevers in babies and children. A full list of references is given.

Alcaligenes Organism in Gangrenous Appendicitis.

EMIL WEISS (*Journal of Infectious Diseases*, May, 1929) has described an organism isolated from patients with gangrenous appendicitis in whom the acute symptoms persisted after the operation. The results obtained in these three instances led the author to extend the bacteriological study of the blood to other cases of appendicitis. Blood culture tubes from fifty patients with normal appendices or chronic appendicitis remained sterile. Fifty blood tubes from patients with various forms of acute appendicitis gave only four positive results; in one *Staphylococcus aureus* was isolated and in the other three a Gram-negative organism was isolated which seems closely related to the genus *Alcaligenes*. The method of isolation, morphology, staining reactions, cultural characteristics, pathogenicity and immunological reactions are fully described and the isolated strain seems to be most closely related to *Alcaligenes abortus* and *melitensis*. The name *Alcaligenes appendicis* is suggested for it.

Complement Fixation Test in Gonorrhoea.

W. FREUDENTHAL, M. FISCHER AND M. STERN (*Klinische Wochenschrift*, February 12, 1929) describe the technique employed in the complement fixation test for gonorrhoeal affections and give

full details of their work. They consider that the test is highly specific and of the greatest value, particularly in chronic arthritic conditions in which the local signs of infection are absent. The reaction is of special value with women owing to the frequent difficulty of obtaining a history. In the differential diagnosis between gonorrhoeal salpingitis and ectopic pregnancy or appendicitis the authors have found the test to be of the greatest value. As with arthritic conditions a failure to react has helped in the diagnosis of tuberculous epididymitis. Regarding its value as a standard of cure, they are cautious because failure to obtain a reaction has been obtained in chronic conditions which were not healed and likewise a positive result does not necessarily mean that the organisms have not been completely eliminated from the body. The technique of the test has not yet been perfected and further work is required, especially in regard to the preparation of the antigen.

HYGIENE.

Phosphorus Necrosis in the Manufacture of Fireworks.

EMMA F. WARD (*The Journal of Industrial Hygiene*, November, 1928) has collected information with respect to cases of phosphorus necrosis occurring among employees in three plants at which fireworks containing white or yellow phosphorus were manufactured. Among the employees of these three factories there have occurred fourteen definite instances of phosphorus necrosis up to the time of the study and another case has developed later. Two of the patients died. As a result of an investigation of the industry the manufacturers have agreed to abolish the use of white or yellow phosphorus in fireworks.

Occupational Cancer of the Skin.

W. J. O'DONOVAN (*The Journal of State Medicine*, December, 1928) states that two conditions must be fulfilled before the occupational factor may be considered causative of epithelioma of the skin. The incidence rate in the occupation under review should exceed that in the general population to a significant extent and in the occupation concerned there should be sufficient association of the worker with a substance proved experimentally to have carcinogenic properties. Epithelioma of the scrotum in chimney-sweeps has been known to exist for approximately one hundred and fifty years, but it was not until 1920 that the second of the two conditions stated above was fulfilled, when Passey produced malignant tumours by the application of an extract of soot to the skin of mice. In recent years numerous instances of epitheliomatous ulceration due to tar, pitch, mineral oil or paraffin have come under observation. One tar distillation factory employing 350 men furnished

three cases of epithelioma in the first quarter of 1920. The labour net has to be cast widely to include all forms of tar contact. One prominent point of clinical importance is the latent period. Tar carcinomata may develop months and sometimes years after the last exposure. Multiplicity of lesions of the skin is a feature of tar carcinomata, the growths of which histologically are squamous and prickle-celled. Secondary growths in the lymphatic glands are extremely uncommon. The problem of carcinoma among industrial workers who handle heavy grade mineral oils, is important. The use of mineral oil in machinery is comparatively modern. Twenty years' employment is probably necessary before carcinomatous changes develop. Mule spinners' cancer, 361 cases of which were reported in the period 1920 to 1927, comes under this heading. Much future trouble of this character may arise unless clean working becomes a cardinal rule in all forms of occupation where the workers come into contact with heavy mineral oils. Destructive squamous-celled carcinoma of the skin of the extremities is commonplace in the history of the personnel of all hospitals at which X ray work in its early days was taken up. The author analyses a series of sixty-one cases of carcinomata of the hand. After excluding persons whose occupation is recognized as hazardous, he concludes that the conception of actinic lesions must be extended beyond the conception implied by Unna's "sailors' skin." Unna under this heading described an affection of those parts of the skin exposed to the weather in persons spending their lives at sea. To the first stage of erythema, pigmentation and hyperkeratosis which may last for years, there succeeds a further one in which large wart-like growths, hypertrophies of the sebaceous glands and papillary and ulcerating carcinoma may appear. Usually all these forms of growth are found together at this period. The ulcers all have an indolent and superficially rodent character, but they begin with a warty nodule. This conception of actinogenic carcinoma must now be extended from sea to land occupations in both temperate and tropical climates.

Epidemiology of Whooping Cough.

E. S. GODFREY (*New York State Journal of Medicine*, December, 1928) states that in 1926 whooping cough caused more deaths in New York State, exclusive of New York City, than any of the other acute communicable diseases of childhood, nearly 60% more deaths than from diphtheria and measles and more than three and a half times as many deaths as from scarlet fever. This is not due to any comparative increase in prevalence or to any accession of virulence. The death rate shows a tendency to decline, though at a slower rate than the other diseases mentioned. Although a disease of the respiratory tract and presumably transmitted by the

secretions from the respiratory tract of an infected individual reaching the respiratory tract of a susceptible individual, whooping cough has not the well marked summer decline that characterizes other diseases believed to be thus transmitted. Whooping cough presents another variation from the usual epidemiology of respiratory diseases, in that in general throughout the registration area of the United States the death rate is higher in rural than in urban communities taking 10,000 population as the dividing line. A third anomaly of whooping cough is its higher death rate in southern than in northern States, partly but not wholly accounted for by the greater mortality among negroes. Here again is a contradiction of a frequently encountered statement that the disease is milder in warm countries than in cold. Still a fourth peculiarity of whooping cough is its preference for females. The average ratio at all ages in New York State, exclusive of cities with over 200,000 inhabitants, is 106 infections among females for every 100 among males and 112 deaths among females for every 100 deaths among males. When the age distribution of infections and deaths is considered, the incentive to postpone the attack until after the third year at least is strengthened. The fatality rate in very young children is high and there is apparently a decrease in susceptibility, independent of a recognized attack, as years go on. Postponement means not only fewer deaths, but possibly a smaller proportion of infections with distressing symptoms. Whooping cough is apparently the most common communicable disease in the preschool years, at least of those which frequently cause death. The foregoing facts point to the necessity of epidemiological studies of the disease in various localities to fill in the gaps of present knowledge and to test promising methods of control or of at least reducing the death rate. There is also great need for some practical means of making an early diagnosis in the absence of characteristic paroxysmal cough. From a practical standpoint the greatest need is to see that young children are protected as far as possible either by isolation or by vaccine or by both and, if attacked, that they be given the benefit of medical advice and such nursing care as the community can afford. This means carrying out much the same plan for whooping cough as for measles—a warning to the general public through the newspapers of the presence of the disease in the community, of its dangers, especially in early life, of the distressing nature of the disease even in older children and of the possibility of preventing or modifying the disease through the timely use of vaccine. Pamphlets should be distributed through schools or by post. Reported infections should be followed up for the purpose of discovering other infections, especially in children under five years of age in the family or neighbourhood.

Special Abstract.

IODINE IN NUTRITION.

THE distribution of iodine in Nature, the part played by it in the metabolism of plants and animals and the occasions of its therapeutic application are matters of enormous importance. They have been discussed in medical, veterinary, agricultural and chemical journals in recent years and much that was revealed long ago, has been resurrected. New information has been added and new points of view have arisen. It is doubtful whether sufficient attention has been paid to the subject from the point of view of iodine as an inorganic constituent of the diet. The clinical uses of iodine are of undoubted importance and no medical practitioner can afford to be without a working knowledge of the indications for the use of iodine, its dangers and its dosage. The proper perspective for all these questions is best gained by a review of the subject as a whole. In these circumstances it is considered advisable to present an account of a recent report made by J. B. Orr and I. Leitch on iodine in nutrition.¹ The report is described as a review of existing information up to 1927. It has, as is stated in the Medical Research Council's preface, been "drawn industriously from a great body of literature, ancient and modern, scattered among journals and books in various languages and of most diverse kinds." It is also expressly stated that no attempt has been made to offer any close analysis of thyroid disease in man or to give special attention to the medical uses of iodine. The word iodine has been used indiscriminately for iodine in the free form (as in Lugol's solution or alcoholic tincture), for potassium iodide and for organic iodine as a thyroid product or a synthetic compound.

Historical Survey.

It is interesting to note that as early as 1820 Coindet, a physician in Geneva, suggested that the beneficial effect on goitre of marine products might be due to the iodine contained in them. He tested this hypothesis and also reported the occurrence of toxic symptoms. In 1849 Prévost put forward the suggestion that goitre was due to deficiency of iodine and bromine in drinking water. This question has been debated up to the present day. Chatin in 1850 correlated the extensive data accumulated by him on the amounts of iodine present in water and foodstuffs in different districts with the regional incidence of goitre. He advanced a hypothesis similar to that of Prévost. The French Academy of Science appointed a commission to inquire into Chatin's findings. The Commission concluded that the data were not sufficient to establish Chatin's hypothesis. In 1855 Koestl proposed that iodized salt should be used in Austria and in 1859 Lombroso recommended that all goitrous individuals of marriageable age should be treated with iodine. In 1860 an experiment was made in three French départements which consists in the administration of iodized salt and one centigramme of iodide of potash per day to school children. The result was the appearance of toxic symptoms. After the failure of this experiment the question of iodine supply and prophylaxis fell into the background. It was in 1895 when Baumann discovered iodine in the thyroid, that the subject was again brought forward. Baumann saw the significance of his discovery. He set out to determine whether goitrous glands contained as much iodine as normal glands and found that the percentage of iodine in goitrous glands is considerably reduced. Much of the work since that time is within the memory of many medical practitioners. The work of Marine has been quoted time and time again. In New Zealand, too, much useful investigation has been carried out by Hercus, Benson and Carter. It will be remembered that Hercus read a paper at the second session of the Australasian Medical Congress

(British Medical Association) in which many of his results were quoted.

Orr and Leitch conclude their historical review by stating that the work of the first quarter of the twentieth century has to a large extent covered the same ground as that of the first quarter of the nineteenth century. The earlier workers, however, had to make their investigations without many of the facilities which are available today.

The Distribution of Iodine in Nature.

Iodine is widely distributed in Nature. It is only in a very few substances such as the saltpetre deposits of Chile and Bolivia and in some marine products that concentrations of up to 0.1% to 0.2% occur. In plant and animal tissues the concentration is so low that the common mode of reckoning is in millionths of a gramme. For this unit the symbol γ is used and the term microgramme has been suggested. Iodine is thus measured microgrammes per kilogram.

Inorganic Iodine.

The only systematic investigation into the geological distribution of iodine is that commenced by von Fellenberg and continued by von Fellenberg and Lunde. Figures are given for various types of formation and for fossiliferous and non-fossiliferous deposits and it is shown that there is a wide variation in iodine content within each formation and that no sharp distinction can be drawn between the iodine contents of different strata. The same holds true of minerals. An example of the latter may be quoted. Cuprite sometimes yields a figure as high as 38,800 γ per kilogram; bornite, another copper ore, contains only 310 γ per kilogram.

Chatin found that all arable soils contain iodine. This has been confirmed by modern investigators. The amount varies from about 600 γ to about 6,000 γ per kilogram; figures outside these limits may be found. The power of concentration of iodine possessed by plants and the retention of iodine in the resulting humus, while other constituents of the weathered rock are carried off in the drainage water, are the main factors in increasing the percentage of iodine in soil. von Fellenberg showed that adsorption by weathered rock and soil is stronger when the reaction is acid rather than basic. Thus moor soils which are highly acid, are relatively rich in iodine and calcium soils which are likely to be alkaline, adsorb relatively little iodine and since in addition they are porous, the iodine will tend to be removed in the drainage water. The suggestion made by von Fellenberg that soils are enriched through the absorption by plants of iodine from the air appears to require much more proof than has been advanced by him. There are certain factors which tend to deplete the soil of iodine. In spite of the great adsorptive power of the soil, iodine tends to be leached out, especially where it is deficient in clay colloids or humus or where it is rich in calcium. Cropping or manuring of the soil is sometimes regarded as causing a depletion of iodine. On the other hand it is held that loss of iodine from soil is chiefly due to the action of inorganic catalysts, especially iron and manganese. Since organic substances and bacteria passively bind iodine, this loss diminishes as the amount of organic matter in the soil increases. Many manures contribute iodine to the soil, for example Chile saltpetre.

The iodine content of fresh water depends on formations through which it flows. Thus the New Zealand workers found that the Clutha River was iodine free, that the Taieri contained 1 γ and the Leth 2 γ per litre. According to the most recent work sea water contains from 17 to 18 γ of iodine per litre. Although marine plants and plankton are very rich in iodine, the common idea that the sea is especially high in iodine as compared with the land is not supported by the facts. The earth's crust and not the sea is the storehouse of iodine.

The estimation of iodine in water supplies has yielded a variety of figures. Water from wells has been particularly high. Amounts as high as 424,000 γ per litre have been found in Switzerland. Figures from water supplies other than well water in America varied from 0.01 γ to 9.5 γ per litre. In New Zealand the figures varied from 0 to 20

¹ "Iodine in Nutrition: A Review of Existing Information," by J. B. Orr and I. Leitch, Medical Research Council of the Privy Council, Special Report Series, Number 123.

γ per litre, in Amsterdam the figure was 12 γ per litre, in Utrecht the variation was from 2.5 γ to 3.0 γ , in Berne from 0.03 γ to 0.36 γ . In England figures were obtained which varied from 0.05 γ to 0.36 γ .

Salt deposits are formed by the evaporation of sea water or the water of inland salt lakes. If all the iodine in inshore sea water were retained in the salt, it would contain about 1,500 γ per kilogram. The amount found, however, is much lower. Figures are given which have been obtained by various observers and these vary from 1.0 to 20 γ per kilogram. The high iodine content of crude sodium nitrate, derived from Chile saltpetre, is worthy of note; it is as much as 0.2% or 2,000,000 γ per kilogram.

Iodine in the air depends largely on the presence of dust, spores and algæ. It varies with the amount escaping from the soil, with the intensity of the wind and with the amount of rain.

Iodine in Vegetation.

The factors affecting the iodine content of plants are the district, the species and the stage of growth. The iodine content of the soil is of much greater importance in determining the iodine content of the plant than is the species to which the plant belongs. Orr and Leitch have found evidence in their own analyses which suggests that the iodine content of legumes is higher than that of cereals, but they state that their evidence is not conclusive and that further strictly controlled investigation is required. Iodine is accumulated during the period of active growth of the plant and retained in the mature tissues.

In dry seaweed from Japan as much as 0.26% and in *Laminaria digitata* from the west coast of Scotland as much as 0.15% to 0.2% of iodine has been found.

Iodine in Animal Tissue.

On account of the fact that it contains a higher percentage of iodine than any other tissue and owing to the problem of the causation of goitre, the thyroid has until recently received more attention than any other tissue. Of the factors affecting the percentage of iodine in the thyroid the most important is the iodine intake. This factor overshadows differences due to species, age and sex. As an example of the way in which the thyroid may be enriched in iodine by the administration of comparatively small doses of potassium iodide it is pointed out that the thyroids of fowls receiving a daily dose of one milligramme of iodine as potassium iodide for three weeks contained 0.3% to 0.5% fresh weight compared with 0.1% to 0.2% in fowls on a similar diet without the addition of the salt. The thyroids of pigs receiving daily doses of ten milligrammes of iodine as potassium iodide per day for five months, yielded a percentage of 0.25 compared with 0.07% in the thyroids of control pigs. Marine showed by perfusion experiment that the iodine content of the thyroid may be increased ten times by perfusion for one or two hours with a solution of sodium or potassium iodide containing in all ten milligrammes of iodide.

There is a seasonal variation in the iodine content of the thyroids of ruminants and Baumann noted that in sheep and human beings there was an inverse relationship between the size of the thyroid and the percentage of iodine. This was confirmed by other observers. There are phases of thyroid activity, however, in which increase of the gland due to storage of colloid is not necessarily correlated with diminution in the iodine content.

Examination of the available data does not reveal any clear cut difference in the iodine percentage found in different species. The enormous differences found between individuals of the same species are in excess of any difference which could be deduced from the available data for different species. The only exceptions to this general statement are sea fish and to a less certain extent rats. As a rule the iodine content reaches a maximum in the adult and begins to decline at an age between fifty and sixty years. Since the physiological activity of the thyroid in the female seems to vary with the sexual activity, it is regarded as probable that the percentage of iodine in the thyroid may also vary.

The iodine content of the blood has been investigated by several observers. Their results are quoted. Orr and Leitch refer to their own findings that in sixteen normal individuals there was an average blood iodine content of six γ per hundred cubic centimetres in spring. In twenty-eight instances in which the blood was sampled in autumn before operations, an average of 8.4 γ was found; of these eighteen lay between 5.0 γ and 8.0 γ . Figures in regard to menstruation are quoted and it is stated that Orr and Leitch have observed that the blood iodine rises during the week preceding menstruation to a maximum at or about the commencement of menstruation.

The question of iodine in tissues other than the thyroid is discussed and it is concluded that if the average figure for thyroid iodine be taken, that is 7.8 milligrammes, this amount will represent about 60% of the total body iodine.

Reference is made to the concentration of iodine in pathological conditions. In many diseased and damaged tissues there is an increased affinity for iodine. This is explained by Keeser's study on the relationship of the reaction of tissues to the adsorption of various substances. Iodine is adsorbed by positively charged matter and hence, since areas in which inflammatory changes are taking place, develop a local acidosis, iodine will be adsorbed in such areas.

The Effect of Iodine on Plant Metabolism.

The effect of iodine on plant metabolism is discussed under several headings. These include the rate of growth, the amount of iodine in plants, plant respiration and metabolism. Experiments by many investigators are quoted and it is pointed out that while the results are not altogether in agreement, they indicate in certain instances a definite stimulation of plant growth by iodine and they suggest that in other instances with properly controlled dosage a similar stimulation might be found. A limited number of experiments suggests that iodine has a pronounced effect on physiological processes in the plant. The activity in nitrifying bacteria is increased and the assimilation of nitrogen promoted. It is held that if these results are confirmed by future work, then iodine must be regarded as playing an important part in the metabolism of plants.

Iodine Metabolism in Animals.

Iodine exists in the blood in both organic and inorganic forms, the latter being derived partly at least from the secretion of the thyroid. The amounts of both forms may be influenced by iodine intake. It is often impossible to distinguish between the direct action of the iodine ions and their indirect action through their influence on the thyroid secretion. Although the influence on metabolism of both inorganic iodine and thyroid secretion has been studied, Orr and Leitch deal primarily with the effects of inorganic iodine on the metabolic processes; where data are available in regard to thyroid secretion, these have been included for purposes of comparison.

Growth and Development.

As far as large animals are concerned numbers of observations and experiments are quoted. Some of these indicate that the administration of iodine is followed by a definite increase in rate of growth and a reduction in the food consumption compared with the gain in weight. The results in other instances were inconclusive. Certain experiments carried out at the Rowett Institute are of interest. Twenty-four heifer calves were studied. They were divided into two groups and one was given five grammes of iodide of potash per head per month. At the end of 486 days there was no appreciable difference between the two groups. When, however, the gain in weight during different periods was examined, it was found that the iodine-fed calves put on weight faster than the controls in winter, but that on pasture during the summer the controls gained on those receiving iodine. This is regarded as suggestive in view of the common seasonal variation in the rate of growth of animals and the seasonal variation in the iodine content of thyroid tissue mentioned previously.

As far as children are concerned, little information is available. Available data emanate from goitre areas. They are in agreement with the tests on farm animals which gave positive results. They may be taken as presumptive evidence that the iodine intake in goitre areas is suboptimal.

When a comparison is made of the effects of iodine and thyroid secretion on growth, it is found that lack of either will result in subnormal growth. It is possible that the action of iodine on growth is indirect and that it consists in supplying a necessary constituent for the thyroid secretion, thus allowing the thyroid to exert its normal influence. Excess of thyroid both limits growth and causes abnormal development. This is not due to the iodine contained in the thyroid secretion. The effects of the thyroid secretion are more complex than those which result from the presence of iodine ions. When iodine is administered in quantities larger than are contained in thyroid doses which produce impairment of growth, no inhibition of growth results and there is no disturbing effect upon the coordination of growth in the viscera. As a result of his work on the metamorphosis of tadpoles Swingle concluded that iodine was the essential factor and the thyroid acted merely by "securing" the iodine. From his later work it appears, however, that iodine *per se* is not the active agent in inducing metamorphosis, but is merely an essential constituent of a compound which under normal conditions is elaborated in the thyroid, and which in the absence of the thyroid can be elaborated by the pituitary.

Nitrogen Metabolism.

In most of the studies on the effect of iodides on nitrogen metabolism attention has been confined to urinary excretion. Details are given by Orr and Leitch of work by Kelly in which it is seen that, although there is an increase in urinary nitrogen following administration of iodine, there is more than compensating decrease in faecal nitrogen, so that the net result is an increased retention. It is possible that with bigger doses breakdown of protein with increased elimination of nitrogen might occur. There are no data showing the complete nitrogen balance with toxic doses of iodides. For doses that are not toxic, the results of Kelly, just referred to, may be taken as evidence that under certain dietary conditions at least increased iodine intake favours the assimilation and retention of nitrogen. In this connexion it is interesting to recall that increase of iodine in the soil increases the assimilation and retention of nitrogen in plants.

Schäfer has shown that the effect of thyroid on nitrogen metabolism depends on the dosage. Janey found that small doses of thyroid increase nitrogen metabolism in exophthalmic goitre, but produce no change or a decreased retention in normal subjects. The isolated thyroid hormone has the same effect. On the other hand Magnus-Levy found in 1895 that large doses of thyroid (six grammes of the dried substance) cause increased excretion of nitrogen and this effect was found to be still more pronounced after removal of the thyroid gland. Boothby, Sandiford, Sandiford and Slosse made a careful study of the effect of thyroid on the nitrogen metabolism of one normal and two myxoedematous human subjects. Their conclusion was that thyroid has no effect on the true endogenous protein metabolism, although it causes a temporary increase in the elimination of urea nitrogen, indicating a decrease in "deposit" nitrogen during the change of equilibrium to a higher level of heat production.

The Methylation of Guanidine-Acetic Acid.

Thyroidectomy deprives the rabbit of the ability to methylate guanidine-acetic acid. This ability may be restored by the administration of potassium iodide and the same result may be obtained by the administration of desiccated thyroid or by serum from a normal rabbit or human being. It has consequently been held that the effect of the thyroid and of the blood serum is due to iodine. This work was carried out by Stuber, Russman and Proebsting in 1913 and Orr and Leitch conclude that

if it is confirmed, the results indicate a specific phase of protein metabolism in which the actions of iodine and of thyroid are identical.

Basal Metabolic Rate, Gas Exchange and Carbohydrate Metabolism.

The lack of uniformity in different thyroid preparations has made quantitative estimations of the effect of thyroid gland on metabolism a matter of considerable difficulty. With thyroxin, the active principle of the thyroid gland, however, accurate studies have been made. After an intravenous injection of thyroxin there is a latent period of six or eight hours before the basal metabolic rate is affected. After that time the rise is rapid, but the maximum effect following a single injection is not reached until eight or ten days after the injection. The rapidity of rise and the level attained depend on the amount injected. The effect of a single injection is detectable for five or six weeks. The effect of thyroxin is rather less on the normal than on the myxoedematous subject. The injection of thyroxin in patients with exophthalmic goitre may have little or no effect on the basal metabolic rate. The gas exchange in myxoedema is subnormal and thyroid feeding raises it to normal. The same is true of animals deprived of their thyroids.

Orr and Leitch quote many experiments dealing with the effects of thyroxin and of iodides in various conditions and they draw the obvious conclusion that regulation of the basal metabolic rate is one of the main functions of the thyroid. In the absence of thyroid secretion either in myxoedema or in animals which have been deprived of their thyroids, the basal metabolic rate is subnormal. The administration of thyroid secretion raises the rate both in normal subjects and in those in whom there is a lack of secretion. The administration of iodine, on the other hand, at least in rats and in persons with exophthalmic goitre, lowers the basal metabolic rate. This action of iodine is possibly due to the fact that small doses tend to change an active into a resting phase in the thyroid. There are no data on effects of iodides on the basal metabolic rate of the normal subject. It will probably be found, when these are available, that the effect will vary with the dosage. The rise in basal metabolic rate following the administration of thyroid appears to be wholly or chiefly due to increased carbohydrate metabolism. Since iodine tends to lower the basal metabolic rate, it might be expected that administration of iodine would result in increased sugar tolerance. This has been shown by Lawrence to be true for diabetes complicated by exophthalmic goitre. Whether it would be true for diabetes uncomplicated by hyperthyroidism is unknown.

Calcium and Phosphorus Metabolism.

Definite degrees of thyroid deficiency or excess are associated with definite and characteristic bone changes. In athyreoidism the femoral epiphyseal activity is reduced; the activity is simply arrested and no degenerative changes occur. In hyperthyroidism there may be an increase of activity. Thyroid promotes the formation of callus. In cretinism the process of ossification is seriously disturbed and administration of thyroid causes closure of the fontanelles and the eruption of healthy teeth where the teeth had previously been absent or carious. These and other bone changes are associated with disturbance in the excretion of both calcium and phosphorus. The administration of small doses of thyroid to rats causes a diminished urinary excretion of phosphorus. It has been stated by Landsberger that in myxoedematous children the inorganic phosphate of the blood is reduced and that prolonged feeding with thyroid will give a gradual rise to normal. Thyroid does not raise the blood phosphate of normal adults. A metabolic experiment was carried out by Heath, Bauer and Aub. They gave a diet deficient in calcium to three persons with severe exophthalmic goitre, one with myxoedema and two normal persons. In all the calcium balance was abnormal. The calcium excretion of the myxoedema patient was below that of the normal

person and the exophthalmic patients had a very high calcium and phosphorus excretion, the excretion in one instance being five times the average excretion in the normal controls. When iodine was administered to the exophthalmic patients, the calcium excretion fell and "approached normal" with the basal metabolic rate. The administration of thyreoid and thyroxin to the normal persons, sufficient to raise the basal metabolic rate 20%, caused a parallel rise in calcium excretion. Both blood calcium and phosphorus were normal throughout.

Jansen found that in hyperthyroidism the blood calcium is low and that in hypothyroidism it is high. It is known that the level of blood calcium is one of the factors controlling nervous excitability. The possibility is therefore suggested by Orr and Leitch that the nervous hyper-excitability characteristic of hyperthyroidism and the dulness and lethargy characteristic of hypothyroidism may be at least in part due to differences in blood calcium. The administration of calcium to overcome the excitability of hyperthyroidism has been suggested. Mellanby found that the addition of thyreoid to a border-line diet which was certain to produce rickets, made the diet definitely rachitic. This effect is probably due to increased elimination of calcium.

Orr and Leitch conclude that the general effects of thyreoid secretion and of iodine on phosphorus metabolism appear to be similar and they add that there is not sufficient evidence to show whether the effect of thyreoid on the calcium balance is also exerted by iodine.

The Effect of Iodine Administration on Organs and Tissues Other than the Thyreoid.

In discussing the effect of iodine administration on various organs and tissues other than the thyreoid, Orr and Leitch refer to recent work and compare it with earlier work on the influence of the thyreoid secretion.

As far as the intestine is concerned, they state that available information suggests that iodine stimulates intestinal movements and that excessive doses cause diarrhoea. Thyreoid seems to have a somewhat similar effect. Most of the observations with the thyreoid, however, have been made on subjects with abnormal glands.

Under the heading of the blood it is stated that Veil and Sturm found that in normal blood on an average 65% of the iodine is in organic combination. They studied the effect of both organic and inorganic iodine on these fractions. One of the experiments should be mentioned. In one instance estimation of the organic iodine content of blood after the administration of potassium iodide revealed a decrease with the rise in total iodine. This is regarded as offering an explanation of the beneficial effects of inorganic iodine in exophthalmic goitre. The administration of organic iodine may result in a large increase in blood iodine. Details of one experiment of Veil and Sturm are given; calculations are made to show that the increase was about six times the amount administered. No explanation suggests itself to Orr and Leitch. In regard to the blood iodine after thyreoidectomy, experiments at the Rowett Institute have shown that while the blood iodine is definitely raised after thyreoidectomy, the high level was not maintained. The level ultimately was below that of normal animals. Later work has confirmed the finding that blood iodine falls after thyreoidectomy. These results are at variance with those reported by Hudson as being obtained with dogs. It is shown, however, that Hudson did not remove the whole gland from his animals and that subsequent hyperplasia took place. Hudson's results fall into line with those obtained with a hyperplastic gland. The thyreoid also has a direct influence on the maintenance of the normal red cell count. The work of Asher suggests that this effect is produced by direct stimulation of the bone marrow.

The clinical appearance of the skin in myxoedema is indicative of the part played by the thyreoid in the normal person. Minor changes in the cutaneous system are regarded as symptoms of hypothyroidism and certain of these symptoms are reversed in hyperthyroidism.

In the section devoted to the cardio-vascular system it is pointed out that Blalock and Harrison in a study of

thyreoid feeding and thyreoidectomy in dogs have shown that administration of thyreoid to dogs caused an increase in both the cardiac output and oxygen consumption. After omission of the thyreoid the rate of oxygen consumption returned to normal more rapidly than the cardiac output. The coefficient of utilization was reduced. These results indicate that the increased activity of the heart is not altogether conditioned by the increase in metabolism, but that there may be also a specific effect of thyreoid on the myocardium. On the other hand, thyreoidectomy caused a diminution of cardiac output which was greater than the decrease in oxygen consumption. The coefficient of utilization was increased. These results, taken in conjunction with the diminished call for oxygen by the tissues after thyreoidectomy and with the reduced oxygen utilization after thyreoid feeding in spite of the increased call, indicate a change in blood or tissue reaction. Since the absorption was decreased and the utilization increased after thyreoidectomy, there was probably some degree of acidosis and after thyreoid feeding the diminished utilization of oxygen might indicate a relative alkalosis. This agrees with what has been found in hypothyroidism and exophthalmic goitre. Further, these results are in complete agreement with clinical observations.

Special reference is made to a class of cardiac condition in which the basal metabolic rate is elevated. While cardiac disease does not in itself cause a rise in basal metabolic rate, dyspnoea due to tachycardia will elevate the basal metabolism. As many as 75% of patients with decompensated hearts have been stated to manifest a raised basal metabolic rate. Veil and Sturm have found a blood iodine content considerably above normal in such persons. Shapiro suggests that in such cases the thyreoid may be secondarily involved by "long standing congestion of the superior circulation." Veil and Sturm attribute the hyperthyroid symptoms accompanying tachycardia of cardiac origin to failure of vagus control.

As far as the sex organs are concerned, it is concluded from available data that, while the thyreoid is necessary for the normal growth and functioning of the sex organs, excess of thyreoid interferes with sexual development and activity. The action of iodine appears to be similar. Moderate increases in iodine supply may stimulate activity, but large doses may be toxic.

The Nature, Distribution and Aetiology of Goitre.

Under the heading of the normal thyreoid reference is made to the thyreoid hormone. It is concluded that the presence of iodine in the thyroxin molecule is essential to its full physiological activity. A further statement is made that it would be interesting to know whether the production of the organic part of the molecule of thyroxin by the gland is limited by the iodine supply or whether synthesis can proceed to the stage of desiodothyroxin or some similar compound in the absence of sufficient iodine to complete the active product.

The chief differences between the normal thyreoid and simple goitre are size and the early development in the goitrous gland of adenomata. It has been shown that the mode of development of the thyreoid in simple goitre is at all stages essentially the same as that of the normal gland. The sole difference lies in the rate of growth. From the commencement of the second dentition the thyreoid in goitre areas manifests a very high rate of growth, giving rise to the "school" or "puberty" goitre. The structure of the gland is normal, but colloid storage may proceed to such an extreme degree that the distended follicles become small cysts. The later stages almost parallel the normal and hence it may be said that the structure and mode of development of the thyreoid in simple goitre are normal, but that the entire process of growth and colloid accumulation is exaggerated. The same is true of thyreoid adenomata. They occur equally in the normal and goitrous gland. The only essential difference again is in the rate of growth. This is so much more rapid in the goitrous gland that the presence of adenomata becomes evident at a much earlier age. They are regarded by Aschoff and Holst as approximating in nature to new growths and they form the basis of most malignant tumours of the thyreoid. The percentage of iodine content of all

goitrous glands is low and it has been found that weight and percentage iodine content vary inversely.

In order to record the distribution of goitre in man Orr and Leitch have placed an appendix at the end of their report in which the available figures for the incidence of simple goitre in different districts are given. Data from New Zealand are included, but none from Australia. The survey made by Harvey Sutton and published in the transactions of the second session of the Australasian Medical Congress (British Medical Association), has been overlooked. Mention is made of the variation in incidence in a district which has been reported. "Waves of goitre" and of spontaneous decrease are not dependent on any known factor.

Under the heading of the aetiology of simple goitre the question of iodine deficiency is discussed. The main factor determining the iodine content of the thyroid is the iodine intake. The evidence afforded by a comparative study of the iodine content of human foodstuffs from goitre and non-goitre areas is collected into a separate appendix. Up to the present time few accurately controlled experiments have been carried out with a view to determining the relationship of different low levels of iodine intake to thyroid size.

In regard to the excess of lime and other elements, recent reviews show that goitre tends to be most frequent on calcium-rich formations and absent from formations such as granite and basalt. But not all chalk or other calcium-rich areas are goitre areas and there is scarcely a formation of any type on which goitre has not been reported to occur. The goitre producing effect of calcium-rich formations has been supposed to be exercised through drinking water derived from these formations. By some the effect is thought to be produced by the calcium in the water. While McCarrison admits the association of goitre with calcium formations, he has not found any correlation between excess of calcium, dissolved or suspended, in the drinking water and the incidence of goitre. There appears to be no evidence that excess of calcium has any effect on the growth of the gland. Calcium might be considered as a factor promoting excess storage of colloid.

The supposed rôle of drinking water in goitre production has been interpreted as due to contamination of the water by microorganisms. McCarrison explains the connexion of goitre with calcium formations as due to the porosity of the strata permitting the passage of infective material into the water. He thinks that the true source of the infective material is the soil. He brought forward a certain amount of experimental evidence to support his views. Hercus, Benson and Carter in their survey found no correlation between contamination of water supplies and incidence of simple goitre. Stiner, reviewing the results of the Swiss Goitre Commission, states that experiments afford no support for the theory that goitre is due to the ingestion of contaminated food or water. McCarrison's views cannot thus be upheld. It is, however, regarded by Orr and Leitch as very probable that infections and toxæmias by depleting the thyroid of iodine might contribute to cause an iodine deficiency.

In exophthalmic goitre an enlargement of the thyroid is usually present or there is a history of previous thyroid enlargement. The presence of enlargement is not essential. The enlargement is in most cases of the diffuse parenchymatous type; colloid is scanty or absent. It appears that the gland is delivering at once to the body all the secretion elaborated. The gland is "fixed in the secreting phase." The percentage and iodine content of the gland are greatly reduced and according to Weir the amount of iodine present as thyroxin is reduced in proportion to the iodine content. On the other hand in contrast to simple goitre the iodine content of the blood is raised.

Iodine in the Treatment and Prevention of Simple Goitre.

It has been shown that when thyroid is given to rats, the rate of growth of the thyroid is decreased and also that the degree of inhibition of growth depends on the dose given and on the iodine content of the preparation. But iodine administration does not inhibit the growth of the gland in proportion to body weight. After removal

of the part of a gland compensatory overgrowth of the remainder occurs. It has been found that administration of iodine will prevent this even after as much as three-fourths of the gland has been removed. Iodine has been shown by Loeb not to inhibit compensatory hypertrophy in guinea-pigs when the major part of the gland has been removed. Marine repeated Loeb's experiments and found that the effect of iodine was to prevent epithelial proliferation. Both organic and inorganic iodine increase the amount of colloid stored in the gland. This is regarded by Orr and Leitch as offering an explanation of their finding that the weights of the thyroids of rabbits, fowls and pigs increased after iodine administration. The increase did not take place gradually in proportion to the dosage of iodine, but occurred only with the highest doses, thus suggesting the possibility of a critical dose or a critical concentration within the gland for the production of this effect. Orr and Leitch state that it is difficult from the available data to deduce the corresponding level for human thyroids. The fact, however, that all goitrous glands contain less iodine *per centum* than normal glands points to the existence of a similar critical concentration in the human gland.

In the section of the report devoted to the effect of iodine on goitrous glands an account is given of the experimental and prophylactic work that has been done in the administration of iodine in places in which goitre is endemic. In a summary it is stated that in the vast majority of cases administration of iodine arrests the growth and reduces the size of goitrous glands. The effect is greater the earlier the treatment is applied. After the age of puberty the efficacy of treatment is reduced and after twenty is practically confined to soft parenchymatous goitres, hard and nodular goitres giving little or no response. The results of clinical tests warrant the hope that, if treatment were applied sufficiently early, simple goitre could be entirely prevented. The use of iodized salt by pregnant women prevents the birth of goitrous children. Hence it would appear that treatment for the prevention of goitre ought to commence in the prenatal period.

Iodine Requirements.

Details are given of experiments to determine the iodine requirements of man, undertaken by several different investigators. The tentative deduction is made that the minimum amount of iodine required in a male adult is about 15 γ a day and in a child about 50 γ . Variable factors, such as the amount of exercise and excitement, increase the requirement and so a liberal margin of safety is necessary.

As far as the doses of iodine required for the prevention of goitre are concerned, the deduction from data which are set out in the report, is that the lower physiological limit of effective dosage for goitre prevention lies about 100 γ per day.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE QUEENSLAND BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, Adelaide Street, Brisbane, on April 5, 1929, Dr. MERVYN PATTERSON, the President, in the chair.

The Cancer Problem.

Dr. L. M. McKillop read a paper entitled: "Some Modern Aspects of the Cancer Problem" (see page 180). He also showed the "Canti film" of cells in mitosis and of cells undergoing irradiation.

Dr. A. C. F. HALFORD thanked Dr. McKillop for his excellent paper and wonderful films. The latter were quite the most interesting anyone could see. He was very pleased that Dr. McKillop had revived the theory of the affinity of the mitoses of sperm cells and cancer cells, as it was one which had always appealed to him, amounting to a fascination. As Dr. McKillop had discussed the effect

of continuous irritation on normal tissue cells which led to the suppression of or, at least, the suspension of all functions except that of reproduction leading to its acceleration in cells progressively immature, it might be interesting to speculate on the endowment of these functions on the first born protozoons to appear on this globe. The phenomena of life were said to comprise assimilation of food, secretion of waste, sensibility to external objects and conditions, locomotion and reproduction. They could not suppose that the first glimmer and spark of life was so endowed, although it would appear that Herbert Spencer, Haeckel and Weismann built their theories on the hypothetical gastræa, a multicellular organized structure in which all the phenomena of life were apparent. They must first regard the state of affairs existing in the "inorganic colloidal solution aggregate" when it first became a living thing. They could hardly suppose that it was capable of anything more than the assimilation of food and secretion of waste. In time it would show powers of selection and rejection concerning the objects with which it was surrounded, a purely instinctive sensibility. Conditions then would demand the power of locomotion with all the advantages associated with such a function. At this stage abundance of food and a greater selection of that which was most suitable, including some acts of cannibalism, caused such a demand on the function of excretion that something must be done to meet the situation. The part of the organism concerned in this was taking up too much of the space needed for other special departments in the making. Annihilation of the *ego* was imminent and to save itself the organism subdivided, perpetuation of the species was assured and the immortality conceived by Weismann was the prize. Might they say that in this the act of reproduction was complementary to the function of excretion? Thus all these functions exercised by the amoeboid cell were not comprehended, but were evolved. How long this evolution took, it was impossible to say, but certainly a very long time. Irradiation, a constituent of the light that gave them life, was seen to cause such a speeding up of cell processes that a mad dance to death ensued. It was more like death from fatigue by overstimulation than atomic dissolution. That the chorionic cell invasion was homologous to that of malignant disease, as suggested by Professor Blair Bell, was in conformity with the revived theory given to them that night and they would watch with great interest the work of so sincere and original an investigator as Professor Bell.

HIS EXCELLENCY SIR JOHN GOODWIN said that he had not intended to speak, but he felt he must thank Dr. McKillop very much for his fascinating address and the interesting film which he (Sir John Goodwin) had not seen before. Canti had been working on it when he left England. Two lots of work in particular had interested him, that of Blair Bell at Liverpool and of Lumsden at the Lister Institute. He considered that Blair Bell's work would bear great results in the future, not necessarily with lead, but perhaps some other substance acting on similar lines. He could not help feeling that really zealous work always bore some result.

DR. MERVYN PATTERSON added his thanks for the paper. He had not seen the film before and considered it a great revelation. He congratulated Dr. McKillop for his clear exposition of the subject and for the matter for thought he had introduced.

DR. McKillop in reply thanked the three speakers and those present for the reception which they had given to his paper.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Melbourne Hospital on May 15, 1929. The meeting took the form of a series of clinical demonstrations by members of the honorary staff. Parts of the report of this meeting have been published in the issues of July 27 and August 3, 1929, at pages 132 and 172.

Hydronephrosis.

MR. ALLAN HAILES showed a woman, aged eighteen years, who had suffered from shortness of breath

on exertion for seven years, due to mitral stenosis following rheumatic fever. For the past two years, however, she had had pain in the right loin which was not worse on breathing and had no relation to meals. She had suffered from shivers frequently and had hot flushes. She had suffered from frequency of micturition and scalding throughout the act for six months and had lost 12.6 kilograms (two stone) in weight in the past two months.

On examination the heart manifested a compensated lesion of mitral stenosis. The pulse rate was 80. The urine had been loaded with pus cells and motile organisms. There had been 42 milligrammes of urea per hundred cubic centimetres of blood and the figures obtained by the urea concentration test were 2% and 2.15%. X ray examination had revealed no abnormality. As the usual medicinal remedies for *Bacillus coli communis* infection failed, it had been decided to submit the patient to renal lavage and while this was done the pyelogram exhibited had been taken and revealed obstructive hydronephrosis of the pelvic type. The urine from that side had contained pus.

The patient had been submitted to operation, the left side being normal and the diagnosis infected hydronephrosis, probably due to an aberrant vessel. At operation there had been gross perinephritis, as instanced by oedema, and although acute kinking of the ureter was present, there had been no aberrant vessel. It had really appeared to conform to the picture that Mr. Winsbury Wight recorded and showed clearly a small hydronephrosis without any trace of an aberrant vessel and probably dependent on the infection. Discussion was invited as to whether renal lavage would have been of any avail.

Jejunostomy in General Peritonitis.

MR. A. E. COATES showed a patient illustrating the effect of jejunostomy in the presence of paresis of the small intestine following general peritonitis. Three cases were reported in which faecal vomiting had been present, and all attempts at opening the bowels by enemata and pilitrin had failed.

One patient shown, Mrs. O., aged fifty-two years, had been admitted to the Melbourne Hospital with diffuse lower abdominal pain of colicky type and vomiting for two days. She had been very ill, with sunken eyes, furred tongue, rapid pulse and temperature of 38.3° C. (101° F.). Her abdomen had been rigid and slightly distended, tenderness had been general. The urine had been loaded with sugar, albumin and diacetic acid and acetone. "Insulin" and glucose had been given and operation performed.

Free pus had been present in the abdomen. The intestines had been distended and red. A perforation of a diverticulum of the sigmoid colon had been found. As the patient was in bad condition, a drain tube had been inserted into the pouch of Douglas, pus evacuated and abdomen closed. Next day the pulse had been very rapid and the tongue furred. Two days later vomiting which had been continuous, had become faecal. A large kidney dish full of faecal matter had been vomited. Under local anaesthesia a left upper abdominal incision had been made, a loop of jejunum withdrawn and two catheters sutured into it. The bowel had been washed out through the catheters, saline solution and glucose had been run in every hour. The patient had ceased vomiting and free discharge had occurred through the tubes. The jejunostomy had closed after one month; feeding by the jejunostomy tube as well as by mouth had been carried out during this time. The bowels had opened naturally after resection of the jejunostomy loop. X ray examination of the colon had revealed the diverticula. No disability had been present. Blood sugar had been normal.

In another instance general peritonitis had followed a perforated appendicitis in a female, aged forty-five years. The bowel had been dark and distended and the patient in *extremis* at operation. Drainage of the peritoneal cavity and drainage of the small intestine through the upper angle of the paramedian incision had allowed free discharge and complete recovery. Resection of the affected coil had been carried out.

In the third case, that of a boy of fourteen years, jejunostomy had been performed for late obstruction following general peritonitis; the patient had been almost moribund. Recovery had occurred with resection of the loop of jejunum.

In these cases the free drainage of the jejunum had been made possible by bringing it outside the abdomen as in a colostomy, and the lavage of the bowel and later feeding by the tube had probably played a great part in recovery.

Synovectomy of the Knee Joint.

Mr. Coates also showed a male patient, aged forty-two years, who gave a history of several years' disability in the knee joint. Pain and effusion had been present. During the preceding month the patient had been attending the out-patient department. Swelling and soft crepitus had been present in the knee joint. X ray examination had revealed no abnormality. Aspiration had been carried out on three occasions, half a litre of fluid had been removed each time, but recurrence had taken place next day. When the joint was empty, palpation had revealed masses of soft tissue, looked on as possibly being synovial fringes in the joint.

At operation a tourniquet had been applied. A U-shaped incision had been made, the patellar ligament divided, the patella turned up and the knee joint fully exposed. Masses of dark red thick synovial tissue had been found. The alar ligaments had been thickened and the edges irregular and grape-like masses had projected. These had been excised as well as the thick synovial membrane lining the suprapatellar bursa and the lateral aspects of the joint capsule. One patch of erosion of the cartilage on the medial condyle of the femur had been seen. Practically the whole of the synovial membrane had thus been removed. The capsule of the joint had then been closed. The *ligamentum patellae* had been sutured. The knee had been firmly bandaged on a back splint. The joint had been kept at rest for fourteen days. Slight flexion had then been allowed. A plaster gutter had been applied. Full movements had been allowed in the fourth week. The patient had been walking in one month in the gutter. He had done full work in six weeks. The range of movement was 70°.

Actinomycosis.

Mr. Coates' last patient was suffering from actinomycosis of the neck. Six weeks before appearing in the out-patient department, the patient, a male of forty-two years, a farmer, had noticed a swelling in the right side of the neck at about the middle of the anterior border of the sterno-mastoid muscle.

Very little pain had been present. The swelling had become larger and at the time of his first examination had presented two red, fluctuant areas surrounded by a brawny indurated mass of tissue in the right anterior triangle and sterno-mastoid area. Incision of the abscess had been performed and the pus discharged had contained "sulphur granules." Microscopical examination had revealed the ray fungus actinomycosis. The patient had been treated with iodide of potash 7.2 grammes (one hundred and twenty grains) three times a day with carbonate of ammonia 0.3 gramme (five grains) in large quantities of water. The area had been dressed with a mercury compound lotion one in 2,000 for one week. He had then been put on 3.6 gramme (sixty grains) of iodide of potash and 0.3 mil (five minims) of tincture of iodine given by mouth three times a day. After three weeks the swelling had considerably reduced in size, but two sinuses had persisted, discharging a little. A block dissection of the affected tissue had then been done, an island of skin with the sinuses in the centre being removed. The dissection had included all the deep fascia as in an operation for removal of glands of the neck from below upwards to angle of jaw, including the upper deep cervical, submaxillary lymphatic and salivary glands. The skin had been loosely sutured. Suppuration had occurred in the area and secondary suture had been performed one week later.

Renal Calculus.

Mr. MERVYN STEWART showed a male patient, aged forty-six years, who had been seen first in the out-patient department. He had complained of pain in the right loin for eight months. The pain at night time had been constant and of a gnawing nature. Four weeks prior to admission he had suffered from an attack of severe pain. X ray examination had revealed shadows in the pelvis which were regarded as phleboliths and a small shadow about six millimetres long in the region of the right pelvi-urethral junction had been regarded as caused by a small calculus. A pyelogram of the right kidney had shown that the pelvis and calyces were normal. The shadow of the calculus had manifested no increased density. On November 29, 1928, the patient had been admitted to hospital and at that time had passed blood by the urethra and had had an attack of pain. Neither pain nor scalding had been present on micturition. He had lost 12.6 kilograms (two stone) in weight in the previous nine months. No abnormality had been detected in heart, lungs or central nervous system. No rigidity and no anterior tenderness had been present in the abdomen, but tenderness had been present over the right kidney which was just palpable. The urine had contained a trace of albumin, some pus cells, some red blood corpuscles and crystals.

At operation on November 30, 1928, an incision had been made in the right lumbar region in the direction of the fibres of the external oblique muscle. The kidney had been exposed and a stone felt within its pelvis. The pelvis of the kidney had been opened just above the ureter, the stone removed and the pelvis sutured. Recovery had been uneventful. Mr. Stewart said that he showed this patient in order to illustrate the value of pyelography, first of all in demonstrating the shadow to be a stone really lying in the renal pelvis and, secondly, in demonstrating the absence of dilatation in the pelvis and calyces and the absence of clubbing in the latter, indicating that the kidney was practically undamaged.

Adenoma of the Thyreoid Gland.

Mr. Stewart also showed a woman, aged thirty-four years, who had been admitted to hospital on August 10, 1928. The patient had suffered from tonsillitis for a week and had then complained of pain, swelling and immobility of the right ankle. Tenderness had been most pronounced over the lateral malleolus. An incision had been made into the right ankle joint and pus, yielding hæmolytic streptococci on culture, had been evacuated. During convalescence several local collections had been opened and the patient had been discharged with a freely movable ankle, but with an unhealed incision.

While the patient was in hospital, it had been noticed that the left side of the thyreoid gland was enlarged on account of the presence of an adenoma. The eyes had been prominent and von Graefe's sign had been present. Fine tremor had been noticed in the fingers, the pulse had been steady with the rate of from 90 to 100 and no symptoms of thyreoid intoxication had been discovered. The patient had not been affected by change in the weather.

The patient had been admitted again on April 10, 1929. Since her discharge from hospital she had been very nervous and irritable, her eyes had begun to protrude and she had complained of palpitation. Examination had revealed enlargement of the left lobe of the thyreoid gland with two palpable adenomata. An adenoma had been palpable in the isthmus. No adenomata had been discovered in the right lobe. Slight exophthalmos had been present and there had been a lag of the upper lid on downward movement of the eye. There had been some tremor of the hand and the pulse rate had varied between 120 and 140 in the minute. The basal metabolic rate had been +58%. The patient had been treated for fifteen days with Lugol's solution in doses of 0.3 mil (five minims) three times a day. The pulse rate had become quieter and the nervousness had decreased. The left lobe of the thyreoid and isthmus had been removed and the pathologist's report had confirmed the diagnosis. The patient's improvement had continued since the operation. Mr. Stewart said that the particular interest in this case lay in the activation of a thyreoid gland, known to be adenomatous, by a severe septic process.

Congress Notes.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

THE Executive Committee of the third session of the Australasian Medical Congress (British Medical Association), Sydney, 1929, announces further details in regard to the programmes of meetings of the sections.

Section of Pathology and Bacteriology.

The meetings of the Section of Pathology and Bacteriology will be held in the Pathology Lecture Theatre in the Medical School of the University of Sydney.

Tuesday, September 3, 1929.

2 p.m.—Address by the President, Professor Peter MacCallum, of Melbourne, on some aspects of anæmia.

"The Cultivation of the Intestinal Protozoa of Man," by Dr. G. M. Heydon, of Townsville.

Wednesday, September 4, 1929.

9.30 a.m.—Combined meeting with the Section of Pædiatrics: "The Results of Treatment of Preparalytic Poliomyelitis by Means of Human Immune Serum," by Dr. Jean Macnamara, of Melbourne.

"The Duration of the Protective Power of Human Immune Serum," by Dr. F. M. Burnet, of Melbourne, and Dr. Jean Macnamara, of Melbourne.

11 a.m.—Combined meeting with the Section of Medicine and the Section of Preventive Medicine and Tropical Hygiene: "Prevention, Diagnosis, Treatment and Control of Scarlet Fever and Diphtheria," by Dr. Helen Kelsey, of Melbourne. The meeting will be held in the Physiology Theatre.

"Modern Methods for the Detection and Abolition of Susceptibility to Diphtheria and Scarlet Fever," by Dr. F. G. Morgan, of Melbourne, and Dr. C. W. Adey, of Melbourne.

2 p.m.—"Corpuscular Medication: A New Method of Administering Heavy Metals and Other Elements; The Method Applied in the Treatment of Inoperable Cancer by the Administration of Lead, Copper and Bismuth; A Progress Report," by Dr. Leon Jona, of Melbourne.

"The Relation Between Streptococcal Toxins and Puerperal Infection," by Dr. N. M. Gutteridge, of Brisbane.

Thursday, September 5, 1929.

9.30 a.m.—"Work on Australian Snake Venoms," by Dr. C. H. Kellaway, of Melbourne.

"The Production of Curative Sera Against the Venoms of Australian Snakes," by Dr. F. G. Morgan, of Melbourne.

11 a.m.—Combined meeting with the Section of Obstetrics and Gynaecology: "Endometriomata," by Professor J. B. Cleland, of Adelaide, to be followed by Dr. E. S. P. King, of Melbourne. Professor H. Jellett will take the chair.

2 p.m.—"Intracranial Aneurysms," by Dr. B. Lynch, of Wellington, New Zealand.

"Some Aspects of the Pathology of the *Corpus Luteum*," by Dr. E. S. P. King, of Melbourne.

"Experimental Cancer in Mice," by Dr. Thomas Cherry, of Melbourne.

Friday, September 6, 1929.

9.30 a.m.—Combined meeting with the Section of Dermatology: "Allergic Problems Arising from a Review of One Thousand Cases of Hypersensitiveness," by Dr. L. A. Maxwell, of Melbourne, and Dr. E. H. Molesworth, of Sydney.

11 a.m.—Combined meeting with the Section of Surgery and the Section of Radiology and Medical Electricity: "Bone Sarcoma," by Professor E. F. D'Ath, of Dunedin, to be followed by Dr. Keith Inglis, of Sydney. Professor Peter MacCallum, of Melbourne,

will take the chair. The meeting will be held in the Anatomy Theatre.

2 p.m.—"The Relation of Treatment to Cure in Gonorrhœa from the Pathological Aspect," by Dr. C. H. Shearman, of Sydney.

"The Clinical Interpretation of the Tests for Determining the Cure of Gonorrhœa in the Male," by Dr. N. M. Gibson, of Sydney, to be followed by Dr. R. V. Storer, of Sydney.

"Molification of the Kahn Flocculation Test," by Dr. B. Durie, of Newcastle.

Section of Neurology and Psychiatry.

The members of the Section of Neurology and Psychiatry of the New South Wales Branch of the British Medical Association have decided to hold a dinner on Tuesday, September 3, 1929. Neurologists and psychiatrists from other States and from New Zealand who are attending the Congress, will be their guests. Members of the Section of Neurology and Psychiatry of the Congress are therefore asked by the Committee to endeavour to keep that evening free of other social engagements.

Membership.

The joint Honorary Secretaries appeal to those who intend to be present at Congress and who have not already done so, to send their application forms in without delay. The difficulty in making adequate arrangements, particularly in regard to the entertainments, is very great when the number of members is not known. Members who are to be accompanied by ladies, will state the names of the ladies, so that the invitations may be correctly addressed.

Church Services.

Special arrangements are being made for members of Congress to attend services at Saint Andrew's Cathedral and Saint Mary's Cathedral on Sunday morning, September 1, 1929. Members who propose to be in Sydney on that day and who wish to attend either of the services, are asked to let the joint Honorary Secretaries know as early as possible, indicating the cathedral selected, in order that reservations of seats may be made. Tickets may be obtained at the Congress office at the University by members who register there before Congress commences. References will also be made to the work of the session in the churches of the other denominations.

Reception on September 1, 1929.

Dr. and Mrs. C. Bickerton Blackburn will be at home at "Greenhithe," Macleay Street, Potts Point, from four to six o'clock in the afternoon of Sunday, September 1, 1929, to members of Congress and the ladies accompanying them to meet Sir Ewen Maclean. Members are asked to accept this as an invitation.

Golf.

In addition to the golf competition for the cup to be presented by Dr. T. G. Wilson, which is to be held at the Royal Sydney Golf Club, Rose Bay, on Friday, September 6, 1929, a competition is being arranged for Tuesday afternoon, September 3, 1929, at the New South Wales Golf Club, La Perouse, which is open to the immediate lady relatives of members of Congress. A cup and trophy are to be presented by Dr. and Mrs. Lyle Buchanan, of Sydney. A notification of this competition is being sent to all members of Congress, together with an entry form which should be completed and returned to the joint Honorary Secretaries.

Congress Museum.

Dr. Leslie Cowlshaw will exhibit a series of early medical publications of historical interest.

Members of Congress who intend to read papers and give demonstrations, are invited to bring specimens, photographs, drawings and other illustrations of their work to Congress and if possible to deliver them at the Congress museum at the Medical School, University of Sydney, on or before Monday morning, September 2, 1929. If desired, the exhibits will be insured while they are in the museum.

Information and inquiries in regard to the museum should be addressed to Dr. Keith Inglis, Sydney Hospital, or to Dr. A. H. Tebbutt, 143, Macquarie Street, Sydney.

The Australian Museum.

The Board of Trustees of the Australian Museum, Sydney, has kindly offered to arrange a display of exhibits of interest to members of Congress. The specimens will be exhibited in the Board Room of the Australian Museum from August 30 to September 7, 1929, and will be accompanied by descriptive labels, drawings and enlargements. The following exhibits will be shown: Casts of skulls or portions of skulls of *Pithecanthropus erectus*, the "ape-man," Heidelberg man, Neanderthal man, Piltdown man, Cro-Magnon man, Rhodesian man, Talgai man, skulls of Australian aborigines, mummified heads, foetal marsupials, platypus, showing poison spur and glands, exhibit illustrating the venom apparatus of snakes, poisonous fishes, including the stone-fish, Chinaman fish, bullrout, the oil or purgative fish, mosquito-eating fish, insects and arachnida injurious to man, including the red-back spider, trap-door spider, scorpions, centipede, ticks, bag moth, cup moth, tapeworms, hydatid cysts, Portuguese man-of-war, poisonous cone shell, the molluscan host of bilharzia.

Transactions of Congress.

The Transactions of the third session of the Australasian Medical Congress (British Medical Association), Sydney, 1929, will not appear in the form of supplements in THE MEDICAL JOURNAL OF AUSTRALIA as was the case in the first and second sessions of Congress, but will be published in one volume and will be distributed only to members of the Congress.

Obituary.

ARTHUR PERCY WALL.

We regret to announce the death of Dr. Arthur Percy Wall which occurred at Randwick, New South Wales, on August 1, 1929.

OLIVER PENFOLD.

We regret to announce the death of Dr. Oliver Penfold which occurred at Bendigo on July 31, 1929.

Diary for the Month.

- AUG. 13.—Tasmanian Branch, B.M.A.: Branch.
- AUG. 13.—New South Wales Branch, B.M.A.: Ethics Committee.
- AUG. 14.—Central Northern Medical Association, New South Wales.
- AUG. 20.—Tasmanian Branch, B.M.A.: Council.
- AUG. 20.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
- AUG. 20.—New South Wales Branch, B.M.A.: Organization and Science Committee.
- AUG. 23.—Queensland Branch, B.M.A.: Council.
- AUG. 27.—New South Wales Branch, B.M.A.: Medical Politics.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xx

- BALMAIN AND DISTRICT HOSPITAL: Pathological Technician.
- ROYAL HOSPITAL FOR WOMEN, PADDINGTON, NEW SOUTH WALES: Resident Medical Officer, Junior Resident Medical Officer.
- THE BRISBANE AND SOUTH COAST HOSPITALS BOARD: Honorary Assistant Surgeons.
- WESTERN AUSTRALIAN PUBLIC SERVICE: Junior Assistant Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phoenix Mutual Provident Society.
	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital. Toowoomba Friendly Societies Medical Institute.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in Western Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	Friendly Society Lodges, Wellington, New Zealand.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and book-sellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad per annum payable in advance.

In the Treatment of
Asthma and Whooping-Cough

Ephedrine has proved to be a valuable drug in the treatment of recurrent asthma and whooping-cough. Clinical evidence has shown that it is essential that the ephedrine employed be absolutely pure and free from all traces of pseudo-ephedrine; further, the therapeutic superiority of naturally-occurring, laevo-rotatory ephedrine over the synthetic product—a mixture of dextro and laevo-ephedrine—has been established as the result of a series of physiological experiments. (*Lancet*, August 4, 1928, p. 226, and *Archiv für Experimentelle Pathologie und Pharmakologie*, 1928, 138, 209).

The physiological activity of the naturally-occurring laevo-product is four to five times that of dextro-ephedrine and approximately double that of the synthetic compound.

Ephedrine Hydrochloride B.D.H. is prepared in the B.D.H. chemical works, from the genuine Chinese plant Ma Huang, by a special process whereby a perfectly pure product is obtained to the exclusion of pseudo-ephedrine and other alkaloids.

EPHEDRINE B.D.H.

The naturally-occurring, pure, laevo-rotatory product

PRESENTATIONS

<i>Tablets for oral and hypodermic use</i>	<i>Aqueous solution in ampoules</i>
<i>Paraffin solution for nasal spray</i>	<i>Aqueous solution for throat spray</i>

For the treatment of whooping-cough a palatable elixir is prepared specially for administration to children

Descriptive literature on request to

G. J. WOOD,
250, Pitt Street, SYDNEY.

THE BRITISH DRUG HOUSES LTD
LONDON

LIVER EXTRACT

No. 343. LILLY

POTENT-UNIFORM

Liver Extract No. 343, Lilly, is now available in quantities to meet all requirements.

Liver Extract No. 343, Lilly, is manufactured under the direction of the Committee on Pernicious Anemia of the Harvard Medical School. It is a product of uniform potency.

Liver Extract No. 343, Lilly, is supplied through the drug trade in packages containing 24 hermetically sealed vials.

ELI LILLY AND COMPANY

INDIANAPOLIS, U. S. A.

DISTRIBUTERS

CHARLES MARKELL & CO.

Sydney, N. S. W.

PROGRESS THROUGH RESEARCH